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Structure, performance and efficiency in European banking.

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STRUCTURE, PERFORMANCE AND EFFICIENCY IN EUROPEAN BANKING

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ABSTRACT.

This thesis examines the structure-performance relationship in the three largest European banking markets (U.K, France and W. Germany) and also investigates the related areas of economies of scale and X-efficiency.

In Chapter 2, we describe the structure of the financial systems in the U.K, France and W. Germany identifying the different types of banks operating in each country and presenting the balance sheet structure of banks (by type of institution). In Chapter 3, we discuss the pre-1993 regulatory regimes prevailing in the three countries under investigation and we set out all measures and banking regulations proposed (E.C Directives and Recommendations) to achieve the Single European Market in financial services. Chapter 4 contains a literature review of the s-c-p model and its applications to different banking markets.

Chapter 5 investigates the nature of the relationship between market structure and bank profits and net interest margins. We adopt the theoretical framework introduced by Hannan (1991) and we suggest that total bank profits and net interest margins are a positive function of the level of concentration in every market the banks operate in. Overall, our results indicate that, at least in certain cases, various market shares do positively affect bank performance measures (bank profitability and net interest margins), suggesting that size in particular market segments may be important in generating higher bank profits.

In Chapter 6, we empirically investigate the issue of economies of scale by estimating a standard translog cost functional form. Our empirical findings suggest that economies of scale are present across a broad range of outputs in all three banking markets under investigation, indicating that there are cost advantages associated with greater bank size.

Chapter 7 tests the efficient structure hypothesis which suggests that bank efficiency rather than concentration is the factor that positively influences both market shares and bank profits. This hypothesis is tested by incorporating two measures of efficiency (X-efficiency and scale efficiency) directly into our s-c-p model. We estimate X-efficiency and scale efficiency using the stochastic cost frontier approach. Our results suggest that the two efficient structure variables do not help in the explanation of the variability of bank profits and, therefore, we find no evidence to support the efficient structure hypothesis.

Finally, Chapter 8 presents our conclusion, suggests some policy implications and identifies the limitations of our study.

CHAPTER 1.

INTRODUCTION.

1.1 Background to the study.

European banking markets have experienced significant changes over the last few years as a result of new regulatory measures being brought in by national governments and of the completion of the single market in financial services. These changes have substantially affected the structure of European banking systems and therefore a wide selection of banking characteristics that are thought to be influenced by market structure. It is the European Union's (EU) Commission's belief[1] that there are great advantages in establishing a single market in financial services although they recognise that quantification of these gains is a rather difficult task to carry out.

The E.U Commission predicts that the transformation of the banking industry resulting from the gradual lifting of existing barriers to freedom of entry and exchange controls on capital movements, will leave European consumers better off. They will be faced with better and cheaper financial products as a result of greater competition among financial institutions, the exploitation of economies of scale and the elimination of X-inefficiencies. These conclusions are based on the *a priori* assumption that prevailing competitive conditions are different across European banking systems and therefore banking profitability would be significantly affected (especially in those banking systems which were relatively protected and where possible oligopoly profits are present) as a result of the increased competition brought forward from the single market proposals.

This *a priori* assumption lies at the centre of the structure-conduct-performance (s-c-p) paradigm. The degree and/or probability of collusion between competitors increases with the number and size distribution of firms in a particular market and is also affected by the

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[1]. E.U Commission, *Research on the "Cost of non-Europe". Basic Findings,* Vol.9. This volume deals with the financial services sector and other areas are extensively covered in the rest of the 16 volumes of the study.

prevailing conditions of entry and exit. Increased or weakened rivalry among the largest firms will influence banking performance characteristics negatively and positively respectively.

This approach has been extensively used in numerous industrial economics studies over the years. Heggestad (1979)[2] identifies three main reasons for testing the s-c-p relationship in banking markets:

a). Is it market structure or the complex regulatory regimes that really determine banking performance characteristics?

b). Which aspects of market structure and which types of regulations have the greatest impact on banking performance?

c). What aspects of bank performance are mostly affected by changes in market structure?

Once academic researchers have shed sufficient light on these issues, they may put forward policy recommendations to help establish those particular market structure characteristics that benefit both consumers and producers of banking services.

This thesis will investigate whether market structure really does matter in determining bank performance characteristics by using the s-c-p paradigm.

There have been many empirical studies that have applied the s-c-p framework or variations of it on the United States banking industry over the last thirty years[3]. These studies have reported contradictory results, some indicating a strong relationship and others no relationship at all or one of unexpected direction. Early studies, for example, Vernon (1971), Fraser and Rose (1976) and Heggestad (1977) suggested that collusive profits occur in U.S banking markets by reporting strong and significant relationships between market structure and bank profit rates, whereas later studies, for example, (Rhoades 1979), Smirlock (1983)

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2. A. A. Heggestad, "A survey of studies on banking competition and performance", in F. R. Edwards (ed.), *Issues in Financial Regulation*, (McGraw Hill: New York, 1979, p.p 449-490).
3. A. R. Gilbert, "Bank market structure and competition: a survey", **Journal of money, credit and banking,** (Nov. 1984, p.p 617-645).

and Osborne and Wendel (1983) report that there is no link at all between market structure and performance.

Many scholars have argued that banks' objectives are different than profit maximisation (a central implicit assumption in the s-c-p framework), namely, to engage in expense-preference behaviour (that is diverting more resources to management expenses rather than maximising profits) or to alter the composition of their portfolio in favour of less risky assets as market structure changes. In both of these cases the relation between performance measures and market structure would be very much weakened.

The s-c-p framework has been challenged on other grounds as well. H. Demsetz (1973)[4] developed the relative efficiency hypothesis arguing that greater profitability stems not from greater market share but from differential efficiency between institutions operating in the same market. Authors that have tested this hypothesis provide evidence supporting it (Smirlock 1983, Glassman and Rhoades 1980). They suggest that "firm-specific efficiency" seems to be the most important variable explaining bank performance in the U.S industry.

Furthermore, Kwoka and Ravenscroft (1986)[5] find evidence of both cooperative and rivalrous behaviour among the largest firms across a number of different industries and suggest that the s-c-p framework may be inadequate in explaining bank performance variability.

More recently, studies by Hannan (1991) and Berger (1995) have made important contributions to the s-c-p paradigm. Hannan (1991) employed an explicit model of the banking firm to derive formally the most commonly tested relationships between market structure and bank performance. This model's main distinction from the traditional s-c-p paradigm lies in the association of bank performance measures with numerous market shares

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[4]. H. Demsetz, "Industry structure, market rivalry and public policy", **Journal of Law and Economics** (April 1973, p.p 1-9).

[5]. J. E. Kwoka and D. J. Ravenscroft, "Cooperation versus rivalry: price-cost margins by line of business", **Economica** (Aug. 1986, p.p 351-363).

in various asset and liability categories that banks participate in, rather than one market share or concentration ratio as predicted by the s-c-p model.

Berger (1995) tested the efficiency hypothesis -put forward by Demsetz (1973)- by incorporating measures of bank efficiency directly into the traditional s-c-p model. These efficiency measures were distinguished between X-efficiency (X-efficiency version of the efficiency hypothesis) and scale-efficiency (scale-efficiency version). X-efficiency provides a measure of how effectively banks are using their inputs to produce a given level of output and covers all technical and allocative efficiencies of individual firms (that are distinct from economies of scale and scope). On the other hand, scale efficiency is a measure indicating whether banks with similar production and management technology are operating at optimal economies of scale. Berger's empirical findings provided some support for the X-efficiency hypothesis but no support at all for the scale-efficiency hypothesis.

In this thesis, we will follow Hannan's theoretical framework and test the hypothesis that various market shares in a range of bank activities are positively influencing bank performance, a hypothesis that has not so far been tested in the s-c-p literature. In addition, we will also investigate the impact of efficiency on bank performance, by incorporating measures of X-efficiency and scale efficiency directly into our empirical analysis, following Berger (1995).

1.2 Aims, methodology and overview of the thesis.

This thesis aims to present evidence of the application of the s-c-p framework and the efficient structure hypothesis on the three largest European banking markets of the U.K, France and W. Germany. This thesis advances the argument presented by the traditional s-c-p framework and suggests that bank performance is affected by various market shares in a range of activities that banks engage in (rather than one concentration ratio and/or market share). Moreover, we also investigate the efficient structure hypothesis in an attempt to determine whether efficiency is the main explanatory feature determining banking performance. The efficient structure hypothesis is tested by using a stochastic cost frontier to derive measures of X-inefficiency and scale inefficiency and then incorporating these measures directly into our model (following Berger (1995)). The advantage of carrying out this exercise is that the relationship between performance and market structure will become clearer once the issue of efficiency has been adequately addressed. Moreover, this study will try to tackle the important issue of banking economies of scale by estimating a standard translog cost function. The empirical investigation of these important questions may reveal interesting relationships and may help the relevant authorities and the policymakers to better evaluate and understand the workings of European banking systems.

The thesis is divided into eight chapters.

Chapter 2 will review the banking systems of the U.K, France and W. Germany, giving us a clear picture of the structural and other market characteristics of each banking system. An important task of this analysis should be to point out the major differences and similarities that exist between these three national markets and set out relevant structure and performance characteristics of these European banking markets. This chapter will also draw attention to the E. U. Commission's Cecchini report that suggests that financial integration will bring about significant economic gains, both microeconomic and macroeconomic gains from eliminating uncompetitive conditions and oligopoly profits in banking markets. The Cecchini report also assumes that the establishment of the Single European Market will bring about lower bank costs through economies of scale that will be made possible by the expansion in bank output. Therefore, this study provides us with a clear justification as to why it is important to investigate whether economies of scale exist in European banking markets.

Chapter 3 provides a general background to the single European market for financial services. Against this background, the analysis will present the existing (pre-1993) institutional structural and regulatory regime under which financial institutions conduct their business in the three countries under investigation. Particular attention will be paid to regulations affecting entry to the banking sector, prudential regulations affecting the activities of credit institutions and monetary, credit and exchange controls which all have profound effects on the workings of any banking market.

This chapter will also focus on the process towards financial market integration. It will present the main Directives, proposals, measures and recommendations adopted or proposed. This presentation will provide us with a clear vision of what a single banking market actually means and more particularly how it is envisaged by the E. U. Commission. A comparison between the pre-1993 and the post-1993 (Single European Market) regulatory regimes will help us in our analysis of the E.U Commission's expectations of the likely economic gains of financial integration. Furthermore, our analysis of the s-c-p paradigm and our estimation of economies of scale and scope will shed light on the important issues raised in the aforementioned Cecchini report.

Chapter 4 contains an extensive literature review demonstrating how the s-c-p model has been applied to various banking samples and to different banking markets (especially in the U.S) over the last thirty years.

Chapter 5 outlines our theoretical framework which is built around Hannan's (1991) s-c-p model, describes our sources and collection of data, analyses all the variables used and reports cross-sectional estimates of tests of the s-c-p paradigm (market shares and profitability and market shares and interest rate variability) for each country. These results may yield important insights to help us answer the following questions:

a). Are changes in market structure (more or less competitive environments) affecting the profits of banking institutions and by how much?

b). Do banks operating in concentrated markets charge higher prices for their products and services than banks functioning in more competitive environments?

The theoretical framework adopted here differs from previous studies in an important respect. For the first time, to our knowledge, we incorporate into the model more than one measure of market share. These market shares (reflecting market structure characteristics) are calculated for various asset and liability categories and they are assumed to be influencing bank performance measures. Overall, our results indicate that, at least in certain cases, various market shares do positively affect bank performance measures (bank profitability and net interest margins), suggesting that size in particular market segments may be important in generating greater bank profits.

Chapter 6 addresses the issue of economies of scale. In the first part of Chapter 6 we present a detailed literature review, an analysis of our theoretical framework and the variables used in the empirical analysis. In the second part of Chapter 6 we report the results of the estimation of a translog cost functional form, which provides us with the scale economy results. If substantial economies of scale are found (particularly for large bank sizes), then banks will be tempted to grow and expand their operations (they may well be encouraged to expand into new markets as well, such as insurance, if there is evidence of significant economies of scope), in order to become more cost effective by exploiting these economies. Our findings suggest that economies of scale are present across a broad range of outputs in all three banking markets under investigation, indicating that there are cost advantages associated with greater bank size.

Chapter 7 tests for the causal relationship in the s-c-p model by including two measures of efficiency, X-efficiency and scale-efficiency. The efficient-structure hypothesis suggests that banks that are able to operate more efficiently than their competitors (X-efficiency, scale-efficiency), incur lower costs and achieve higher profits and increased market shares that may result in increased concentration. Therefore, efficiency is the factor that positively influences both market shares and bank profits. We estimate X-efficiency and scale-efficiency using the stochastic cost frontier approach. Our empirical findings suggest that the two efficient structure variables do not help in the explanation of the variability of bank profits and, therefore, there is no evidence to support the efficient structure hypothesis.

Finally, Chapter 8 presents our conclusions, suggests some policy implications stemming from our results and recognizes and identifies the limitations of our study.

CHAPTER 2.

CURRENT TRENDS AND STRUCTURE AND PERFORMANCE IN EUROPEAN BANKING MARKETS.

2.1 Introduction.

The aim of this chapter is twofold. Firstly, to identify the most influential trends that have affected European banking systems during the past two decades and, secondly, to analyse the major structural and organisational differences that characterise the three banking systems of the U.K, France and W. Germany, under investigation in this thesis[1]. We also note the Price Waterhouse Cecchini study and its findings concerning the comparative competitive conditions prevailing across different European financial systems. Therefore, the analysis presented in this chapter will provide important background information that will assist us in the interpretation of the empirical investigation that will follow.

Section 2.2 provides a short history of banking in Europe and discusses the different organisational characteristics of various European financial systems. Section 2.3 describes the structure of the banking systems of the U.K, France and W. Germany and compares the prevailing similarities and differences. Section 2.4 is concerned with the framework of rules and regulations governing European banking and suggests what effect these regulations have on market structure. Section 2.5 attempts to show why structure-performance issues play a significant role in the workings of the European financial systems and examines the Price Waterhouse/Cecchini study; its aims, methodology and results. Finally, section 2.6 contains some concluding remarks.

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[1]. This thesis investigates the banking systems of France, W. Germany and the U.K because of their considerable size and importance in the European Union. W. German banks instead of banks from unified Germany were included in our analysis because the collection of our data for 1990 proceeded the reunification of the two Germanies that took place in October 1991.

2.2 Perspectives of European banking systems.

2.2.1 *A short history of banking in Europe.*

The current state and workings of various European banking systems has evolved over the last three centuries and has been significantly affected and shaped by political, social, economic and geographical factors. During the seventeenth and eighteenth centuries European banking systems were dominated by small private banks with limited geographical domain and a few private institutions based in big cities (financial centres) that specialised in international dealings.

By the end of the nineteenth century, the distinction between metropolitan banks and country banks became less clear in the U.K as the metropolitan banks started expanding to the provinces by opening up new branches. This expansion was accompanied by numerous acquisitions of small private provincial banks by the big metropolitan banks, thus creating a banking system characterised by a high degree of concentration, a characteristic that survives to this day[2]. British banks were also responsible for developing and adhering to strict cash and liquidity ratios even before the First World War, rules that were followed in Continental banking systems as well (France, Germany etc).

The nineteenth century also witnessed the establishment of a very large number of banks (primarily merchant banks) by immigrants attracted to London and the British Isles by the country's colonial connections and world-wide trade relations and industrial might (until 1892 the U.K was the biggest industrial power in the world manufacturing the greatest volume of industial goods in the world[3]). Many of those bankers were Germans and included

2. In 1884 there were 325 provincial and metropolitan banks and by 1913 there were only 113 banks left operating in England and Wales (Scotland and Ireland had a different banking structure). See also K. E. Born, **International banking in the 19th and 20th centuries** (Berg Publishers, 1983).
3. Ibid. See page 178.

the Baring brothers[4], A. M. Rothschild, J. H. Schroeder, Kleinwort Sons whose established institutions are in many cases still conducting their business to this day.

Big joint-stock banks in France had developed two separate divisions that specialised in deposit and investment banking operations. Three deposit banks came to dominate the banking system by the end of the nineteenth century: Societe Generale, Credit Lyonnais and the Comptoir National d' Escompte de Paris (widely refered to as the Big Three, see Revell 1987). The significance and influence of each of these banks for the system as a whole may be put into perspective if we consider that each bank's deposits and outstanding short-term loans and overdrafts by far outstripped those held by the 17 largest provincial banks' combined volume of deposits and loans.

In sharp contrast to the British banking system, the pre-1914 German banking system was characterised by the very clear division of operations between many different types of banks (private banks, joint-stock banks, credit co-operatives and savings banks). Born (1983) points out that:

"On the whole, the characteristic features of the German banking system were: a close connection between credit institutions and industry, a marked concentration (in respect of the number and size of its bank mergers, Germany was second only to England), a strong development of agricultural credit, large numbers of credit co-operatives and finally, a dense network of savings banks" (p. 168).

Although, German joint-stock banks were taking over small private banks in large numbers throughout the later half of the nineteenth century, the overall number of private banks in the system increased substantially as new private institutions were setting up business continuously and by 1913 there were 1,221 private banks in the country.

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[4]. Barings bank collapsed in February 1995 after accumulating huge losses (approximately £860 million) in the futures markets.

Furthermore, it is important to note that the close links observed between German banks and industrial enterprises (widely observed in the modern economy as well) took various forms ranging from the advancement of credits to the supply of directors on the supervisory boards of industrial companies (in sharp contrast British banks mainly engaged in financing international trade operations and transactions).

Concentration and increased government influence were the two most important structural characteristics in the development of European banking systems during the inter-was years (1918-1940). Most European governments (the British banks being a notable exception) introduced extensive legal frameworks to regulate and control the operations of banks. These rules and controls were put into force in 1931 in Germany, in 1934-35 in Belgium, in 1935 in Switzerland and in 1941 in France. In the U.K there were no formal controls in place but a set of non-binding recommendations that the Bank of England put to the banks. In other words, banks themselves were responsible for the supervision and prudent conduct of banking business.

Born (1983) has observed that concentration rose substantially in most European banking systems during the period 1918-1940. In the British banking system, the Big Five held a total volume of deposits of £2.3 billion compared with £248 million held by all the remaining banks in England and Wales. In France, there remained only 75 regional banks in 1937, from around 3,000 that were in operation by the turn of the century. The Big Three deposit banks held between 53 and 76 per cent of all banking sector deposits during the inter-war years. In Germany, concentration was not as high as in France and England, with the Big Five German banks holding around 30 per cent of all bank deposits and 36 per cent of all bank short-term credits and loans in 1929[5].

The influence of national governments on banking systems was expanded through the foundation of state-owned specialised credit institutions, in addition to the introduction of complex legal frameworks. For instance, a new state bank was set up in Germany to provide

[5]. Ibid. See page 94.

financial assistance to the country's nationalised industries. Other state banks were established in France to help small businesses and small investors with the difficult economic circumstances particularly in the years of the Great Depression.

Furthermore, the demarcation lines between the activities of different types of banks were increasingly becoming more blurred in Germany and France in spite of the legal organisational framework that guaranteed those divisions. In England, the clear division of banking activities between different types of banks was maintained in spite of the absence of formal regulations dictating such a division.

Concentration and increasing governmental influence continued to characterise the development of European banking systems after the Second World War as well. In France, there was a wave of nationalisation in 1945 when the government took under its control the biggest deposit banks in the country. In West Germany, the central giro institutions which were controlled by the local governments sharply increased their share of banking business. Concentration increased significantly in all three countries in the 1950's and 1960's when numerous mergers were allowed to take place (even between big banks), thus bringing about remarkable structural changes (Born 1983).

2.2.2 *Existing structural differences between European banking systems.*

The two most important factors that greatly affect the structure of the banking industry are, the legal framework on the one hand, and the extent of the state's participation in the banking business on the other hand. J. Revell (1987)[6], has pointed out some important differences between the Continental European and British banking systems.

Continental European banking systems are widely characterised, by the presence of various special credit institutions such as savings banks and co-operative banks (these are

6. J. Revell, *Mergers and the role of large banks*, Institute of European Finance, Monograph in Banking and Finance no. 2, (University College of North Wales at Bangor: IEF).

often organised on a local or regional basis) which are usually owned by the state and provide relatively inexpensive long to medium-term funds for sectors such as industry, agriculture, property and real estate development etc. Another important element of Continental systems, is the expansion of commercial banks in other areas apart from banking[7]. Since the turn of the century, banks widely participated in the ownership and management of industrial corporations, in a drive to successfully diversify their investment portfolios.

Table 2.1. Sectoral ownership breakdown of banking institutions in 1988 (percentages of aggregate total assets).

Country	Private	Public	Mutual	Foreign
Austria	0.4	43.8	55.8	-
Belgium	37.0	16.8	11.0	35.2
Denmark[1]	69.5	1.3	29.2	-
Finland	44.5	10.5	44.2	0.8
France	24.2	42.2	20.2	13.5
W.Germany	32.0	49.5	16.7	1.8[3]
Greece[2]	11.0	83.7	-	5.3
Ireland	61.7	4.0	12.9	21.4
Italy	12.3	67.9	16.8	3.0
Netherlands	61.2	8.1	17.7	13.0
Norway	41.2	19.9	38.9	-
Portugal	6.8	87.1	1.9	4.2
Spain	49..0	2.3	37.7	11.0
Sweden	52.9	19.3	24.9	2.9
Switzerland	53.4	19.6	15.8	11.2
U.K	31.8	0.7	14.2	53.3

Source: E. P. M. Gardener and P. Molyneux, *Changes in European Banking,* (London: Allen Unwin, 1990).

Notes: 1) Figures for percentage of total deposits, 2) Figures for percentage of total credit, 3) Branches of foreign banks, 4) Private banks are owned wholly or almost wholly by the

[7]. See also A. Mullineux, **International Banking and Financial Systems: a Comparison**, (Graham and Trotman, London, 1987).

private sector and public banks are owned by the public sector (government). Mutual banks are those institutions where some or all of the profits are shared between shareholders and/or members (in case of cooperative banks).

Distortions can arise in those European banking systems where the state is the principal owner of the banking system, for example governments may finance budget deficits with inexpensive funds drawn from the banking system, thus draining away money resources and capital from the private sector[8].

As can be seen from Table 2.1, the public sector is widely involved in E.U banking markets (owning more than 80 per cent of total banking sector assets) in Greece and Portugal, almost 70 per cent in Italy and over 40 per cent in France, Austria and W.Germany (in W.Germany there is considerable involvement in the savings bank sector and the regional banks as well). On the other hand, private domestic sector banks had a relatively stronger presence (close to 40 per cent or higher of total banking assets) in Belgium, Denmark, Finland, Ireland, Netherlands, Norway, Spain, Sweden and Switzerland (with Netherlands, Ireland and Denmark having private sector ownership of more than 60 per cent). Furthermore, foreign banks play a significant role in the U.K and Belgium and to a lesser extent Ireland (where there are many U.K banks anyway).

The next table (Table 2.2) illustrates some of the structural and performance characteristics of the ten biggest banks in the U.K, Germany and France (taken from *The Banker* magazine). At the bottom of the table we have calculated mean values for each national banking system separetely.

[8]. This practice has been very popular in Greece particularly during the 1980's when the public sector debt soared under the Socialists (see Oikonomikos Tahydromos Feb.1993, issue 6).

Table 2.2. Structural characteristics of the top British, W. German and French banks.

Banks	Assets	($m)	Capital ratio	assets (%)	Profits ratio	capital (%)	Return ratio	on assets (%)
	1991	**1994**	**1991**	**1994**	**1991**	**1994**	**1991**	**1994**
U.K banks								
Barclays	258,339	254,112	4.50	4.00	8.6	29.7	0.39	1.14
Natwest	229,272	290,835	4.56	3.53	2.4	18.9	0.11	0.67
Abbey National	107,379	147,373	5.18	3.93	21.8	26.3	1.08	0.99
Lloyds	95,971	127,120	5.02	4.73	27.8	37.2	1.34	1.60
Midland	111,126	314,872[a]	3.84	5.71	1.6	29.6	0.06	1.57
TSB	44,949	56,289	6.88	4.44	1.2	34.8	0.09	1.45
Royal Bank of Scot.	56,397	71,596	5.02	410	3.2	29.2	0.16	1.17
Bank of Scotland	43,482	53,851	4.93	4.43	12.8	31.9	0.57	1.32
Stand. Chartered	43,902	53,459	3.74	4.38	18.2	36.8	0.69	1.49
S.G Warburg	24,614	31,050	6.20	5.41	20.4	4.0	1.17	0.22
French banks								
Credit Agricole	307,203	328,152	4.77	5.27	11.5	10.9	0.52	0.56
CFP	199,728	242,219	5.54	4.47	3.9	8.7	0.19	0.38
Credit Lyonnais	306,335	327,903	3.41	2.66	10.4	-19.4	0.34	-0.57
BNP	275,876	271,635	3.71	3.84	8.8	5.5	0.31	0.21
CCEE	172,973	187,411	4.19	5.63	10.1	2.8	0.41	0.16
Societe General	234,748	278,006	3.01	3.21	16.5	12.7	0.46	0.40
CMCN	71,429	86,826	5.89	7.33	-	7.7	0.58	0.55
GBP	74,898	86,607	4.45	4.56	9.9	11.4	0.42	0.50
CIC	89,243	97,839	2.92	2.86	11.9	6.8	0.34	0.19

Banque Indosuez	70,881	76,332	3.20	3.01	15.9	-1.4	0.48	-0.04
W. German banks								
Deutsche Bank	296,226	368,261	3.80	3.55	21.2	15.7	0.77	0.56
Dresdner Bank	194,488	253,818	3.33	3.49	13.5	13.2	0.45	0.43
Commerzbank	149,506	220,704	3.70	2.95	13.6	19.0	0.48	0.50
Bayerische Hypot & Wechsel Bank	127,376	177,540	3.05	3.07	13.8	14.0	0.40	0.40
Bayerische Vereinsbank	149,495	204,423	2.53	2.46	15.0	15.1	0.35	0.34
Westdeutsche Landesbank Giro	151,916	237,535	2.43	3.32	1.7	5.9	0.04	0.19
Kreditanstalt für Wiederaufbau	99,001	158,736	3.06	3.32	4.2	5.3	0.12	0.15
Norddeutsche Landesbank	85,877	118,507	3.44	2.59	5.2	9.7	0.14	0.23
Bayer. Landesbank	111,635	171,816	2.53	2.13	9.0	9.1	0.21	0.19
DG Bank	135,670	126,487	1.74	2.40	8.3	6.4	0.18	0.15
Top ten U.K banks (average)	101,543	140.055	4.98	4.46	11.8	27.8	0.56	1.16
Top ten French banks (average)	180,331	198,293	4.10	4.28	10.98	4.57	0.40	0.23
Top ten W. German banks (average)	150,319	203,782	2.96	2.92	10,55	11.3	0,31	0.31

Source: **The Banker,** Europe's top 500 banks (September 1992, July 1995).

Notes: a). Part of the Hong Kong and Shanghai Banking Corporation Group (HSBC).

Table 2.2 indicates that on average French banks were the largest (size is measured by total volume of assets in $m) in 1991 and the W. German banks are the largest in 1994. The average size of the top French banks rose from $180b in 1991 to $198b in 1994, with W. German banks average size increasing from $150b in 1991 to $203b in 1994. The most sound of the three (soundness is measured by the capital assets ratio) are the British banks (4.98% in 1991 and 4.46 in 1994) and the least sound appear to be the W. German banks (2.96% in 1991 and 2.92 in 1994)[9].

Moreover, when performance measures are taken into account we can see that the British banks have outperformed the W. German and French banks in both years 1991 and 1994 (judged on both performance measures, namely, profits on capital and return on assets). Furthermore, the French banks were the worst performers among the three in 1994 (with profits on capital at 4.57°o and return on assets at 0.23%), whereas W. German banks had an average 11.3 percent profits-capital ratio and 0.31 percent return on assets ratio (1994).

2.3 The European financial system structure

2.3.1. *Introduction.*

This section describes the structure of the financial systems of France, W. Germany and the U.K. It identifies the different types of banks operating in our sample of countries and presents some industrial structure data (such as total assets and total deposits by category of institution) showing the relative importance of each category of institution in all three national banking markets. This analytical description also contains data on the balance sheet structure and performance of banks (by type of institution), showing the relative involvement of banks (by type of institution) in various assets and liabilities activities.

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[9]. Although, German banks tend to underestimate the true value of their capital ratios, because of substituting hidden values on their equity holdings.

2.3.2 *Overview of European market structure.*

The present market structure of European banking systems has been shaped (particularly during the 1970s and 1980s) by developments such as liberalisation, internationalisation, globalisation, deregulation, universalisation and technological advancement.

Internationalisation signifies the ever increasing expansion of banks beyond their home domestic market boundaries and has three main effects: increases the number of foreign banks operating in domestic E.U markets (thus increasing competition), increases the assets and therefore the relative importance of foreign banks operating in European markets and thirdly increases in domestic banks' involvement in international activities.

Globalisation exemplifies the worldwide integration of capital markets and money markets (through swaps and arbitrage operations) and it is now common for banks to hold global investment portfolios and get involved in different financial markets (worldwide) simultaneously[10] (see also Havrilesky and Schweitzer, 1987).

Deregulation and liberalisation are trends that were brought forward as a result, or in anticipation of, E.U regulatory changes affecting the financial services sector. According to Gual and Neven (1993) two forms of deregulation exerted a significant influence on national banking market structures: structural deregulation and conduct deregulation. Structural deregulation refers to the lifting of entry barriers (both for domestic and foreign entrants)[11] and the gradual elimination of strict demarcation lines that were distinguishing different types of specialised banks (a trend known as universalisation). Conduct deregulation relates to

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10. Banks' incentives to globalise are strengthened when their domestic markets are saturated and/or foreign markets are relatively underdeveloped and therefore they may proceed with globalisation plans even if they detect diseconomies of scale in their money and capital markets operations.

11. As early as 1965, the E.U Commission proposed a Directive on the Abolition of Restrictions on Freedom of Establishment and Freedom to Provide Services in Respect of Self-employed Activities of Banks and other Financial Institutions. This Directive was adopted by the Council of Ministers in June 1973.

developments such as increased rivarly and lower profitability that are accentuated by the prospect of increased competition.

Universalisation marks the European-wide trend towards adopting universal banking models, a trend that was recently accentuated in the light of E.U legislation (Second Banking Coordination Directive). One of the main advantages of universal banking systems is that banks may be able to benefit from economies of scale and economies of scope as Steinherr and Huveneers (1990) have argued. Other commentators such as Forestieri and Onado (1989), Gardener (1990), Metais (1990), Shaw (1990), Abraham and Lierman (1991) and Revell (1992) have also emphasised the disadvantages of the universal banking model and argue that universal banking is not the most efficient form of banking organisation. However, the universal banking model is gradually evolving in the U.S as Saunders and Walter (1994) suggest.

Significant changes were also introduced with the adoption of the First Banking Co-ordination Directive in 1977 which introduced the first E.U-wide measures towards the harmonisation of regulation. The supervision of credit institutions operating in more than one member state has gradually shifted from the host country to the home country (where the bank was originally established). The next important E.U piece of regulatory reform was introduced in 1988 with the Second Banking Co-ordination Directive which incorporated a range of measures intended to complete the process of full integration of the European financial services sector. We will deal with the E.U legislative programme in more detail in Chapter 3.

2.3.3 *British financial system.*

The British financial system is widely considered as one of the most open systems in the Western industrial world. It is supervised and regulated by the Bank of England (the British central bank). The Bank of England was founded in 1694 and took its present form in 1946 with the adoption of the Bank of England Act. The Bank of England is formally directed by the British Treasury and has responsibility for issuing notes and executing monetary policy (setting of interest rates), in addition to its tasks to supervise and regulate the banking system.

The following table records the changes that have occured in the British banking system (its main indicators) between 1984 and 1993.

Table 2.3. Major indicators of the British banking system.

	1984	1990	1993
Population (mil)	55.6	57.2	57.9
Number of banks	598	636	574
Number of branches	14,382	20,560	11,878
Population per branch	3,866	2,782	4,878
Number of ATM's	5,653[c]	13,612	18,296[a]
Population per ATM	9,835[c]	4,202	3,165[a]
Bank employees (thousands)	520.8	499.4	486.2
Bank employees as a percentage of total population	0.94	0.87	0.84

Source: Bank of England, *Quarterly Bulletins* (April 1985, Feb. 1991, Feb. 1994), British Bankers Association, *Annual Abstract of Banking Statistics* (1994) and Vesala (1993, p.p 188-189). Notes: a). 1992 figures, c). 1983 figures.

We observe a slight decrease in the number of authorized British-owned banking institutions (from 598 to 574) and a considerable decrease in the number of branches these banks operated (from 14,382 to 11,878). Furthermore, the network of ATM's has been significantly expanded and as a consequence the number of inhabitants per ATM has been reduced dramatically (from 9,835 to only 3,165). Another significant decrease occured in the number of bank employees both in absolute terms and in relation to total population as a result of a widespread structural reorganisation exercise.

Table 2.4. The British banking system. Total assets by category of institution (1984-1994).

Type of institution	Number of banks 1984	1990	1993	Total assets in Pound Sterling (bil) 1984	1990	1994	% of total assets '94
TOTAL COMMERCIAL	279	209	155	271.3	542	694.7	35.08
Retail banks[a]	19	21	22	152.9	426.1	590.4	29.8
Merchant banks[b]	36	38	27	26.6	59.4	44.8	2.2
Other British	224	150	106	91.8	56.5	59.5	3.0
TOTAL FOREIGN	379	320	325	488.6	724.6	968.2	48.8
American banks	64	42	36	116.3	110.1	131.5	6.6
Japanese banks	25	31	37	167.6	254.5	245.04	12.3
Other Overseas[c]	290	247	252	204.7	360	591.7	29.8
TOTAL OTHER DEPOSIT-TAKING BANKS	200	107	94	110.8	235.7	317.1	16.01
Discount Houses	10	8	7	8.1	15.1	8.06	0.4
Building Societies[d]	190	99	87	102.7	220.6	309.05	15.6
Total banking system	858	636	574	870.7	1502.3	1980	100.0

Source: I. Swary and B. Topf, *Global Financial Deregulation: Commercial Banking at the Crossroads*, (Cambridge:Mass:Blackwell 1992), Bank of England, *Monetary Statistics*, (Jan.1995, July 1995), Bank of England, *Quarterly Bulletin*, (Feb. 1991).

Notes: a). Since 1985 this group includes the Trustee Savings Bank, b). Until 1984, they were known as accepting houses, c). This group includes consortium banks, d). The Building Societies are not part of the monetary base but they are included in the wide monetary aggregate M4.

The British financial system is described and classified by the following categorisation[12]:

[12]. This broad and somewhat general categorisation is made in accordance with recent legislation such as the Building Society Bank Act of 1986, the Financial Services Act of 1985, the Banking Act of 1987 and the

a). Commercial banks

b). Foreign banks

c). Building societies

d). Discount houses.

Commercial banks.

Retail banks. This group is comprised of the Big Four London clearing banks (namely Barclays, Lloyds, Midland and National Westminster and their subsidiaries), the Scottish clearing banks (Bank of Scotland and Royal Bank of Scotland), the Cooperative Bank, the Trustee Savings Bank and the National Girobank and National Savings Bank.

The London clearing banks accept retail and wholesale deposits, lend on short and/or long term basis to all sectors of the economy (even to foreign corporations and governments), provide money transmission services and other related banking services such as insurance broking and securities services, credit cards etc (these related banking services are usually provided through subsidiaries). During the 1970's and 1980's the London clearing banks expanded and diversified their activities into investment banking and into overseas markets and thus are now recognised as universal banks[13].

The Trustee Savings Bank provides all retail banking services in contrast to the Cooperative Bank which primarily provides personal banking services and local authority financing. The Trustee Savings Bank (now part of the Lloyds Bank group) employs 26,860 staff at year-end 1994 and is the seventh largest bank (measured by total assets) in the U.K at year-end 1994 (according to the Banker's classification; Annual Abstract of Banking Statistics 1995). On the other hand, the Cooperative Bank has a rather small branch network (about 129 branches nationwide at year-end 1994) and is owned by about 100 retail co-operatives.

Trustee Savings Bank Act of 1988). See also D. E. Lomax, **London Markets after the Financial Services Act**, (Butterworths, London, 1987).

[13]. More detailed information about the expansion and diversification of the London clearers can be found in N. Coulbeck, *The multinational banking industry*, (London: Croom Helm 1984).

The National Girobank (owned by the Alliance and Leicester Building Society) and National Savings Bank offer banking services (mainly deposits and cash withdrawal facilities) through the British Post Office network and invest heavily in government securities[14].

The British retail banks hold the biggest share of total sterling deposits and total banking sector assets than any other type of institution, accounting for 32.2 percent of total sterling deposits and 29.8 percent of total assets at year-end 1994 (see Tables 2.4 and 2.5). Furthermore, there has been a very substantial rise in the involvement of the group in the interbank deposits markets and CDs markets (between 1984 and 1994-foreign institutions having the largest share). As far as the asset side of the balance sheet is concerned, the retail banks' main business is short-term loans. However, during the last few years, the group has moved into medium and long term lending (see the *Annual Abstract of Banking Statistics* of the British Banker's Association, Vol. 8). Moreover, the provision of financial services such as unit trusts, personal equity plans and portfolio management, has become an ever larger growth area for the retail banks (see I. Swary and B. Topf for further details). Additionally, all major retail banks operate merchant bank subsidiaries (see Table 2.6).

Merchant banks. This group of banks provides both wholesale banking (all retail banking services including the collection of deposits) and investment banking (including corporate finance). Merchant banks have particularly specialised in portfolio management, securities and foreign exchange trading, mergers and aquisitions and various other financial advisory services. There were 27 merchant banks in the U.K at year-end 1993 accounting for only 2.2 percent of total banking assets and 2.2 percent of total sterling deposits (see Table 2.5). Merchant banks are primarily involved in mergers and acquisitions, securities underwriting and international banking and investment management activities.

14. The National Girobank was taken over by the Alliance and Leicester Building Society in 1990.

Table 2.5. The British banking system. Total sterling deposits by category of institution (1984-1994).

Type of institution	Pound 1984	Sterling 1990	Deposits (bil) 1994	% of sterling deposits '94	% change 1984-94
TOTAL COMMERCIAL	136.2	372.4	663.8	60.9	387.5
Retail banks	97.4	298.5	351.2	32.2	251.8
Merchant banks	9.8	34.9	24.7	2.2	152
Other British banks	29.0	39.03	35.06	3.2	12
TOTAL FOREIGN BANKS	44.8	155.5	178.6	16.3	304.5
American banks	10.9	18.07	20.0	1.8	83.4
Japanese banks	8.4	40.02	35.0	3.2	316.6
Other Overseas banks	25.5	97.5	123.6	11.3	382.3
TOTAL OTHER DEPOSIT-TAKING INSTITUTIONS	110.1	175.2	246.1	22.6	123.6
Discount houses	7.4	14.4	10.1	0.9	13.5
Building societies	102.7	160.8	236.0	21.6	131.3
Total banking system	291.1	703.1	1088.5	100.0	273.8

Sources: Bank of England, *Monetary Statistics,* (Jan.1995, July 1995), Bank of England, *Quarterly Bulletin,* (Feb. 1991).

Other British banks. These are various U.K registered banks, banks in the Channel Islands and the Isle of Man, British overseas banks and finance houses. Finance houses mainly provide commercial credit services to corporate and business customers such as leasing, factoring, hire purchase etc. and consumer credit services (most important of all is car finance). This group of banks is comprised of 106 institutions (1993) taking up 3.0 percent of total assets and 3.2 percent of total deposits at year-end 1994 (Tables 2.4 and 2.5).

In spite of the fact that there were 106 institutions in this grouping by 1993, the group's involvement in the CD's markets and the money market loan markets was relatively small (see Table 2.6).

Foreign banks.

This group of banks constitutes an important sector of the British financial system. There are 325 foreign banking institutions' subsidiaries (in 1993) from all over the world sharing 48.7 percent of total banking assets[15] (the total is simply the summation of all domestic banks' assets as reported in balance sheet statistics), but only 16.3 percent of total sterling deposits at year-end 1994. The countries most heavily represented in the U.K market are the USA and Japan (with 36 and 37 institutions respectively at year-end 1993, see Tables 2.4 and 2.5)[16]. These foreign institutions are heavily involved in various Euromarkets (like the Eurodollar and Eurocurrencies markets, the Eurobond market etc) and the British securities market. Their involvement in the domestic retail market is very small.

Most foreign banks concentrate their activities on international banking and the securities markets and wholesale markets. Moreover, there has been a considerable increase in the group's private sector loans (in both domestic and foreign currencies) from £16.3 billion in 1984 to £78.1 billion in 1994 (see Table 2.6). Some foreign banks have recently become active in the retail and commercial mortgage market. During the 1980's Japanese banks outgrew the American banks in relative strength, dominating the foreign bank grouping, but since then the position has been reversed once more due to the significant problems Japanese banks have had to face in their domestic market in the early 1990's.

Building societies.

Building societies have traditionally obtained deposits from depositors which they have subsequently lent to home buyers (for further details about Building Society deposits refer to British Building Societies Association's *Annual Abstract of Building Society*

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[15].This figure seems to be very high, but we have to take into account the fact that by June 1987, 28 per cent of Japanese banks' international assets were booked in London (see *Bank of England Quarterly Bulletin* 1987, Vol. 27). This enormous concentration of Japanese assets combined with additional foreign-owned bank assets make up the huge share of British sector banking assets.

[16]. The U.K market is a particularly attractive one for American and Japanese banks, because they are allowed to engage in security businesses (they are prohibited from doing that at home) which is very often a highly profitable activity. Another very important element contributing to the concentration of foreign institutions is that London being the traditional financial center in Europe, provides the best location for doing business in Europe. London also has the world's largest foreign exchange market (see **The Banker**, Aug. 1993).

Statistics, 1991). However, during the last decade building societies have significantly expanded their operations towards more commercial banking areas, thus increasingly competing with retail banks (see Callen and Lomax, 1990). Furthermore, retail banks have greatly increased their share of the home loan market.

The 1986 Building Societies Act permitted the Building Societies to offer a wide range of financial services such as insurance, credit cards, money transaction accounts, non-financial products etc., thus opening up previously prohibited market segments and allowing them to challenge the supremacy and dominance of the big clearing banks in most of the operations these banks engage in. This development has resulted in intensifying competition in the U.K retail banking market. By 1993 there were 87 Building Societies employing 15.6 percent of total banking system assets and 21.6 percent of total sterling deposits (these figures refer to 1994, see Tables 2.4 and 2.5). Although the 1986 Act allows bulding societies to compete in almost all banking markets, Abbey National (the biggest building society at that time) chose to become a clearing bank and obtained a banking license in 1989 and therefore Abbey National is no longer a member of the building societies group[17].

The following table (Table 2.6) gives a picture of the balance sheet structure of British banks by type of institution showing their relative involvement in different banking activities.

The building societies operate about 7,000 branches nationwide and attract their funds mainly through deposits and the issuing of shares (79 percent of total group assets). The group's participation in the CDs and interbank deposits markets is considerably limited; the group heavily concentrate on retail deposits markets (for example at year-end 1994, retail borrowing reached 70.8 percent of total banking sector assets, see Table 2.6).

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[17]. Other Building Societies have announced their plans to be converted into public companies. The Halifax Building Society is expected to do so in the spring of 1997 and the Woolwich Building Society in the autumn of the same year. Moreover, the Alliance and Leicester and the Nationwide Building Societies are expected to follow suit and their announcements are imminent (see the Independent, Jan. 13, 1996).

Table 2.6. Major items in the balance sheet of British banks (billion pounds).

Years	Total bal. sheet	Private sector deposits	%	Interbank deposits	CD's	Money market loans	Private sector loans	%
Retail								
1984	152.9	72.0	47	10.1	5.7	19.7	64.2	41.8
1990	426.1	218.05	51.1	27.8	21.3	53	234.2	54.9
1994	590.4	278.2	47.1	33.4	30.2	71.7	275.9	46.7
Merchant								
1984	26.6	6.1	2.3	1.7	0.8	6.3	2.8	1.05
1990	59.4	17.4	29.2	11.2	3.3	19.05	14.2	23.9
1994	44.8	12.1	27.0	6.05	1.3	9.2	9.2	20.5
Other Brit.								
1984	91.8	8.4	9.1	13.9	1.2	13.0	17.4	18.9
1990	56.5	14.2	25.1	17.1	0.7	11.8	31.8	56.2
1994	59.5	12.7	21.3	16.9	1.05	7.8	32.8	55.1
Foreign								
1984	488.6	8.5	4.4	17.4	3.4	23.1	16.3	8.8
1990	724.6	37.5	5.1	41.5	27.7	67.3	78.9	10.9
1994	968.2	53.4	5.4	35.8	35.4	78.9	78.1	8.0
Build. Soc.								
1984	102.7	96.5	50.0	0.4	0.8	15.7	81.9	44.9
1990[a]	220.6	160.8	72.7	23.4	2.07	na	na	na
1994	309.05	219.1	70.8	24.8	8.2	na	na	na

British Banker's Association, *Annual Abstract of Banking Statistics*, (British Banker's Association Statistical Unit, May 1991), Bank of England, *Monetary Statistics,* (Jan.1995, July 1995), Bank of England, *Quarterly Bulletin,* (Feb. 1991).

Notes: The percentage figures express shares of each item in the total balance sheet. a). By 1989, Abbey National is no longer part of this group.

Discount houses.

The role of this type of banking institutions is to act mainly as intermediaries between the Bank of England and the commercial banks. The discount houses obtain their funds through the short-term money market and primarily invest these funds in short-term assets. By 1993 there were only 7 discount houses in the U.K accounting for 0.9 percent of total sterling deposits and 0.4 percent of total assets (Tables 2.4 and 2.5).

Performance and capital adequacy ratios of British banks.

The following table (Table 2.7) presents performance measures and capital adequacy ratios for each London clearing bank and the two biggest Scottish banks separately.

Table 2.7. Performance and capital adequacy ratios for the six biggest clearing banks.

Banks	**1982**	**1984**	**1986**	**1988**	**1990**	**1992**	**1994**
Pre-tax profits/tot. assets (%)							
Bank of Scotland	1.3	1.0	1.2	1.2	1.1	0.43	0.9
Barclays	0.8	0.9	1.1	1.3	0.6	-.016	1.2
Lloyds	1.0	1.1	1.5	1.8	1.1	1.46	1.8
Midland	0.5	0.2	0.8	1.2	0.0	1.00	1.1
National Westminster	0.8	0.9	1.2	1.4	0.4	0.28	1.0
Royal Bank of Scotland	1.0	1.0	1.1	1.4	0.9	0.06	1.2
Total capital base total assets (%)							
Bank of Scotland	8.7	7.4	10.6	9.9	8.9	4.22	8.5
Barclays	6.7	7.5	8.3	8.1	7.1	4.00	6.9
Lloyds	7.2	7.4	9.8	10.5	8.7	5.01	10.2
Midland	6.2	6.3	8.5	9.4	7.7	4.58	7.3
National Westminster	6.8	6.5	9.0	9.5	8.5	3.89	7.7
Royal Bank of Scotland	9.3	7.5	9.7	10.0	9.0	5.10	8.2
Free capital ratio (%)							
Bank of Scotland	6.0	5.5	9.4	7.9	7.5	-10.3	7.7
Barclays	3.9	5.1	6.7	6.7	5.5	-4.0	5.9
Lloyds	4.6	5.0	7.5	8.0	5.6	3.1	8.5
Midland	4.0	4.4	7.2	7.7	5.3	2.68	5.8
National Westminster	4.6	4.5	6.7	6.1	6.0	7.3	6.2
Royal Bank of Scotland	5.2	5.0	7.4	7.8	6.8	1.2	6.7

Sources: British Banker's Association, *Annual Abstract of Banking Statistics*, (British Banker's Association Statistical Unit, Vol. 8: May 1991), The Banker, *The World's Top 1000 banks* (Sept.1993, July 1995).

Notes: The following definitions are in accordance with the Bank of England's definitions. Total capital base = Shareholder's funds + Minority interests + Loan capital + General provisions. Free capital = Total capital base - Infrastructure. Infrastructure = Property and Equipment + Trade Investments. Free capital ratio = Free capital / Public Liabilities. Public Liabilities = Total Liabilities - Shareholder's funds - Minority interests - Loan capital.

As far as pre-tax profits are concerned, the two Scottish banks appear to have had the best results among the London clearing banks (except 1988) and Midland presented the worst performance of all.

The Royal Bank of Scotland, Lloyds and the Bank of Scotland displayed both the highest capital base to total assets ratios and the highest free capital ratios and Midland and Barclays displayed the lowest ratios. Hence, it seems that pre-tax bank profits tend to be higher for those banking institutions that exhibit relatively higher capital base ratios.

Additionally, the two Scottish banks presented the highest capital adequacy ratios (risk assets ratios), ranging from 11 to 13 percent (1988-1994). On the other hand Barclays and Lloyds displayed the lowest capital adequacy ratios.

Table 2.8. Risk assets ratios for the London clearing banks (%).

Banks	Tier 1 Capital				Total Capital			
	1988	1989	1990	1994	1988	1989	1990	1994
Bank of Scotland	-	6.8	5.8	5.8	-	11.0	10.6	11.4
Barclays	-	5.7	5.8	7.0	9.3	9.0	8.3	10.4
Lloyds	5.6	4.4	5.2	7.8	10.1	7.4	8.5	12.8
Midland	6.5	5.4	5.4	6.6	11.8	10.0	9.8	11.5
National Westminster	5.5	5.3	5.2	6.4	9.8	9.1	9.1	11.0
Royal Bank of Scot.	7.3	7.0	6.9	6.4	13.0	12.8	11.6	10.6

Source: British Banker's Association, *Annual Abstract of Banking Statistics*, (British Banker's Association Statistical Unit, Vol. 8: May 1991). The Banker, *The World's Top 1000 banks* (July 1995).

Notes: Tier 1 capital includes only the core of a bank's strength: common stock and preference shares (the few that are perpetual, irredeemable and non-cumulative). The above capital adequacy risk assets ratios are based on the Bank of England's implementation of the Basle convergence agreement on capital measurement.

2.3.4 *French financial system.*

The French financial system is characterized by the high degree of government intervention and ownership of the banking system and the relative unimportance of the capital markets (in comparison to other major industrial countries). De Boissieu (1990) argues that until the mid-1980's the French banking system was one of the most regulated systems in the industrialized world and that helped to increase concentration, enhance inefficiency and reduce competition. However, this heavy interventionist government policy was reversed by the banking law that came into force in July 1984 and laid the foundations of the present regulatory framework, which is much more in balance with other developed banking systems (for an in-depth analysis of the French banking system, see C. de Boissieu, **The French banking system**, Basil Blackwell 1990).

The banking system is supervised by a number of different regulatory institutions:

a). **The National Credit Council** determines the state policy affecting the financial markets and issues general banking laws and regulations.

b). **The Banking Commission** monitors the operation of the system ensuring that all banks comply with the existing regulations and restrictions.

c). **The Bank of France** issues bank notes and has the responsibility of planning and conducting monetary policy and

d). **Various Commissaries of the Government** operate in a complementary role to that of The Banking Commission and monitor the activities of the central agencies (which are established for each type of credit institutions) and their members.

Table 2.9 presents various important indicators of the French banking system. French banks operated 25,569 branches by year-end 1990. The absolute number of bank employees decreased between 1984 and 1990 but increased between 1990 and 1993 by thirty two thousand. Furthermore, the percentage of bank employees in the total population of the country (end 1993) was only 0.47 (compared with 0.84 in the U.K). The number of

Automated Teller Machines (ATM's) rose by more than 3 times between 1983 and 1992 (by the end of 1992 there were 3,278 inhabitants per ATM compared with 10,764 in 1983).

Table 2.9. Major indicators of the French banking system.

	1984	1990	1993
Population (mil.)	54.9	56.4	56.8
Number of banks	931[a]	799	610
Total bank branches	25,477	25,569	na
Number of ATM's	5,100[b]	15,101	17,324[c]
Number of bank employees (thous.)	251	236	268
Population per branch	2,155	2,205	na
Population per ATM	10,764	3,734	3,278[c]
Bank employees as a °o of total population	0.46	0.41	0.47

Source: Bank of France Quarterly Statistical Bulletins (June 1991, June 1994).

Notes: a). 1987. b). 1983, c). 1992

The Banking Act of 1984 defined various types of banking institutions. One can distinguish two broad categories of institutions: a).Commercial banks and b). Other financial institutions. However, the French banking system was highly structurally segmented particularly until 1966-67. The Banking Law of 1941 distinguished three different categories of banking institutions, namely *deposit banks, investment banks* and *regional banks*[18].

The *deposit banks* (banques de depots) were the largest category of banks. Prior to the 1966 67 reforms, deposit banks were not allowed to take deposits of maturity greater than two years and to hold more than 10 per cent of private companies' capital. Therefore, these restrictions effectively prevented the deposit banks to offer long-term advances (at least in a large scale) and also prevented them from involvement in investment banking activities. The

[18]. For a more detailed historical background on the evolution of the French banking system see J. Maycock, *European Banking: Structures and Prospects* (Graham and Trotman: London 1977) and R. Weston, *Domestic and Multinational Banking* (Croom Helm: London 1980).

three big national banks, BNP, Credit Lyonnais and Societe Generale were members of the deposit banks group.

The investment banks (banques d' affaires) were not allowed to expand nationally by opening up new branches. They were only permitted (until 1966/67) to take deposits of maturity greater than two years and therefore their operations were accordingly restricted (they were effectively prevented from engaging in commercial banking activities, where the deposit banks were the dominant force). The introduction of the 1966/67 reforms eased these restrictions and allowed both groups of banks involvement into each other's areas. As a result many structural changes took place. Some investment banks (Banque Rothschild, Banque de l' Indochine etc.) chose to become deposit banks and undertook branch network expansion. Others, such as Paribas, established a holding company operating two subsidiary banks (a deposit bank and an investment bank). There were also a great number of mergers between investment banks and takeovers of small deposit banks by investment banks.

The *regional banks* were small local institutions that conducted their business within the borders of the provinces of their origin. They were usually combined to form large banking institutions such as Credit Agricole and Credit Mutuel.

The introduction of the Banking Law of 1984, distinguished between two main categories of banks: commercial banks and other financial institutions.

Commercial banks.

Universal banks. The French financial system is dominated by the three largest universal banks (Banque National de Paris, Credit Lyonnais and Societe Generale). These types of banking institutions are authorized to do business in all areas of banking and insurance and brokerage services but nevertheless they tend to specialize in specific areas (except the large universal banks). The three largest universal banks had been owned by the State since 1945. In 1982 the new Socialist government nationalized another 36 universal banks but this process of nationalization was reversed in 1986 by the new Conservative administration which privatized many important banks including Societe Generale, Paribas, Credit Commercial de France and others.

This type of bank dominates the French banking system representing 52.8 percent of total market assets, 49.3 percent of total private sector loans and 57 percent of total private sector deposits at year-end 1993 (see Table 2.11). Moreover, they are actively involved in both the interbank deposits and the interbank loans markets, having control of around 40 percent of those markets at year-end 1993. The universal banks group can be divided into three sub-groups: the big three banks (BNP, Credit Lyonnais and Societe Generale), foreign banks and other universal banks.

The three big banks offer wholesale banking services along with non-bank financial services and portfolio management services. On the other hand foreign banks do not actively participate in the retail sector of the market, concentrating instead on the international interbank and financial markets (see Table 2.11).

Cooperative banks and mutual institutions. In this category we find the biggest French bank, Credit Agricole along with Credit Mutuel and the so called People's banks (Banques Populaires or Credit Populaires). Credit Agricole is an institution composed of around 3,000 local cooperative banks, 92 regional organizations and a central agency, the Caisse Nationale de Credit Agricole (CNCA). Credit Mutuel is a grouping of over 3,000 regional mutual associations which conduct operations through 21 regional banks; there is also a central bank overseeing the group and providing banking services. The Credit Populaire is a grouping of 38 banks which are managed again through a central agency, the Caisse Centrale de Banques Populaires. The bank is mainly involved in lending to individuals and small and medium sized companies.

This grouping controls 17.1 percent of total banking market assets, 15.8 percent of total private sector loans and 16.2 percent of total private sector deposits at year-end 1993. Credit Agricole and Credit Mutuel are the two institutions of this category of paramount importance for the French banking system. One of the main lines of business of the cooperative and mutual banks is the financing and distribution of credits to the agricultural sector[19].

Credit Agricole and Credit Mutuel have extensive branch networks in the provinces contrary to the universal banks which mainly operate branches in big cities. Furthermore, the universal banks are strongly involved in the insurance and brokerage services markets in contrast to the co-operative and mutual banks whose primary line of business is the financing of the agricultural sector.

Other financial institutions.

Savings and Provident banks. This category includes 180 banks at the end of 1992 (a significant drop from 364 banks five years earlier), which are grouped into 21 regional societies. The principal activities of this group of banks are focused on the small savings and loans section of the market, while the bulk of their assets are managed by a central agency called the Caisse de Depots et Consignations (CDC).

The savings banks account for 7.1 percent of total banking assets, 9.1 percent of total private sector loans and 9 percent of total private sector savings and deposits at year-end 1993. It is important to note that this group of banks was totally restructured between December 1986 and December 1988 and the number of institutions significantly dropped from 364 in 1967 to 180 in 1993. The group is also actively involved in the interbank loans market and the securities market (see Table 2.11).

Finance companies and securities houses. These are not officially classified as banks under the 1984 Banking Act and most of them are subsidiaries of banks. They carry out most banking activities, particularly specializing in leasing, factoring and instalment credit operations. At year-end 1993 there were more than 1,000 finance companies and securities houses accounting for 10.6 per cent of total banking market assets and 8.6 percent of total loans (see Table 2.11).

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[19]. Until 1989 the various cooperative and mutual banks (especially Credit Agricole) enjoyed a monopoly in the allocation and distribution of credits to the agricultural sector.

Table 2.10. The French banking system by category of banks.

Type of banks	Number of banks			Total assets F. F (bil.)			% of total assets
	1987	1990	1992	1984	1990	1993	1993
A. Commercial							
Universal[a]	na	na	na	3,722	6,433	7,577	52.8
Cooperative and mutual	190	194	na	1,215	2,329	2,462	17.1
Other banks[b]	na	na	na	254	396.8	431	3.0
Total Commercial	377	419	448	5,191	9,158.8	10,470	73.0
B. Other Financial							
Savings and Prov.	364	186	180	1,267	1,416	1,018	7.1
Finance companies	na	na	na	415	1,233	1,522	10.6
Specialized banks	na	na	na	798	1,169	1,326	9.2
Total other financial	555	381	181	2,480	3,818	3,866	27.0
Total banking system	932	800	629	7,671	12,976	14,336	100.0

Sources: Vesala (1993) and Bulletins de la Banque de France, *Statistiques Monetaires et Financieres Annuelles* (1990,1993).

Notes: a). Includes foreign banks, b). This group includes the French Bank for Foreign Trading and Credit Municipal.

Specialized banks. In addition to the above categories there are also 32 official and semi-official specialized banks (having a different special legal status) specializing in medium and long-term financing of both the public and private sectors. This grouping of banks accounted for 9.2 per cent of total market assets by 1993 and includes very well known names such as:

_**Banque Francaise du Commerce Exterieur (BFCE)**: An import-export state bank that mainly provides foreign trade services and insurance to export and import companies.

_**Credit National**: Established after the second World War, Credit National is heavily involved in financing the industrial public sector through the issuance of bonds and securities.

Credit Foncier: A mortgage bank primarily engaging in housing and other construction finance.

Caisse Nationale des Marches de l'Etat (CNME): This institution has the unique role of providing guarantees, to support the loan applications of individuals and enterprises and is also actively engaged in refinancing bank loans.

Credit d' Equipement des petites et Moyennes Enterprises (CEPME): Along with CNME, provides credit for small and medium-size companies.

Institut de Developpement Industriel: A state bank established in 1970 with the principal purpose to supply funds to industries of great strategic national importance in conjunction with the rest of the banks.

Societes de Developpement Regional: This bank operates under the direct control of the Ministry of Finance and finances state investments in various provincial areas of the country.

Specialized banks represent almost one tenth of the French banking system at year-end 1993 (9.2 percent of total assets) and control 10 percent of total private sector loans and 5.4 percent of total private sector deposits (Table 2.11). In conjunction with finance companies, specialized banks raise their funds through the interbank markets and by issuing securities.

As far as the whole French market is concerned, there were significant increases in the volume of total assets, total loans and total deposits over the last few years. More specifically, total assets increased by 112.6 percent between 1984-1993, whereas, total deposits increased by 185.9 percent and total private sector loans increased by 222.4 percent over the same period [20](see Table 2.11).

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[20]. However, many French banks are currently facing considerable difficulties as a result of a bad year in terms of performance in 1995. Low lending demand, fierce competition, significant falls in capital markets volumes, restrictive labour laws and a depressed real estate market contributed to the substantial reduction in bank profits. Credit Lyonnais and Credit Foncier faced large losses and were bailed out by the French government (in 1995 and April 1996 respectively). For further details, see **Morgan Stanley European Financials Briefing**: France: Things happen slowly, (13-10-1995) and **Morgan Stanley: Investment Research U.K and Europe**: European Banks: France, what went wrong in 1995 (Feb. 1996).

The following table presents a few important items in the balance sheets of French banks, distinguished by category of institution.

Table 2.11. Major balance sheet items by category of banks (F.Fr bil.).

	Total bal. sheet	°o	Loans to priv. sector	%	Interbank loans	Priv. sector deposits[a]	%	Interbank deposits
COMMERCIAL								
Universal								
1984	3,722	48.6	1,001	31.1	1,727	866	32.9	2,066
1990	6,433	49.5	4,327	48.1	1,303	3,800	56.1	1,283
1993	7,577	52.8	5,151	49.3	1,718	4,299	57.0	1,695
Cooperative and mutual								
1984	1,215	15.8	616	19.1	361	720	27.3	179
1990	2,329	17.9	1,517	16.8	412	1,066	15.7	229
1993	2,462	17.1	1,651	15.8	555	1,222	16.2	312
Other banks								
1984	254	3.3	28	0.9	137	12	0.5	162
1990	396	3.0	215	2.4	92	209	3.0	41
1993	431	3.0	273	2.6	109	224	2.9	69
OTHER FINANCIAL								
Savings and Provid.								
1984	1,267	16.5	706	21.9	201	949	36.0	56
1990	1,416	10.0	1,322	14.7	188	1,192	17.6	51.4
1993	1,018	7.1	958	9.1	237	678	9.0	38.5
Finance companies and security houses								
1984	415	5.4	268	8.4	71	47	1.8	236
1990	1,233	9.5	816	9.0	na	670	9.8	360
1993	1,522	10.6	905	8.6	178	831	11.0	471
Specialized banks								
1984	798	10.4	599	18.6	72	40	1.5	358
1990	1,169	9.0	955	10.6	125	270	3.9	183
1993	1,326	9.2	1,045	10.0	196	407	5.4	151
Total fin. institutions								
1984	7,671	100.0	3,218	100.0	2,569	2,634	100.0	3,057
1990	12,976	100,0	8,985	100,0	3,886	6,770	100,0	3,894
1993	14,336	100,0	10,441	100,0	4,382	7,533	100,0	4,145

Bulletin de la Banque de France, *Statistiques Monetaires et Financieres Annuelles*, (1990, 1993).

Notes: a). The interbank deposits figures for 1984 include certificates of deposits.

Performance and capital adequacy ratios of French banks.

The next table (Table 2.12) presents some performance and capital adequacy measures for the four largest French banks over the period 1985-1994.

Table 2.12. Performance and soundness measures for the biggest French banks.

Ratios (in %)	1985	1986	1987	1988	1989	1990	1992	1994
Pre-tax profits/assets								
BNP	0.40	0.54	0.48	0.44	0.39	0.21	0.24	0.21
Credit Lyonnais	0.39	0.48	0.56	0.45	0.44	0.53	-0.02	-0.56
Societe Generale	0.36	0.55	0.50	0.59	0.61	0.35	0.37	0.40
CNCA	-	0.36	0.43	0.49	0.52	0.45	0.54	0.55
Capital/assets								
BNP	1.98	3.15	3.17	2.8	2.67	3.23	3.59	3.84
Credit Lyonnais	1.23	1.91	2.69	3.0	2.67	3.41	3.04	2.66
Societe Generale	2.03	2.90	2.83	3.4	3.36	3.01	3.10	3.21
CNCA	4.26	4.36	4.08	4.4	4.88	4.35	5.22	5.27
Pre-tax profits/capital								
BNP	20	17	14	16	15	7	6.9	5.5
Credit Lyonnais	31	25	20	17	18	19	-0.8	-19.4
Societe Generale	19	18	17	19	19	12	12.9	12.7
CNCA	-	7	10	12	12	11	11.0	10.9

Source: **The Banker's** Top 500 banks (Issues of 1986, 1986, 1987, 1988, 1989, 1990, 1993, 1995).

As far as the two performance measures are concerned (pre-tax profits to assets and pre-tax profits to capital ratios), Societe General and CNCA had higher profits than the other two banks in 1994, and prior to this year Societe Generale had outperformed both of them. It is important to point out, the significant and consistent worsening in BNP's results from

1986 onwards (from 0.54 in 1986 to 0.21 in 1994). These profit rates are quite miserable[21] when compared with the profit rates of the London clearing banks, which were higher by at least 1 percent for most of the period 1980-1994 (see Table 2.7).

The capital to assets ratios of the banks examined showed a substantial improvement during the period 1985-1994, increasing from around 1.25-2.0 percent in 1985 to about 3.0-5 percent in 1994. Credit Agricole was the soundest of the four with capital to assets ratios of consistently higher than 4.00 percent over the last six-seven years, reaching 5.27 percent in 1994. However, despite this notable increase over the last years, these ratios are very poor in comparison with the free capital ratios of the London clearing banks which were higher than 6 and even 7 percent (see Table 2.7).

[21]. See **Morgan Stanley European Financials Briefing**: France: Things happen slowly, (13-10-1995) and **Morgan Stanley: Investment Research U.K and Europe**: European Banks: France, what went wrong in 1995 (Feb. 1996).

2.3.5 The West German financial system.

The West German banking system is the largest banking system in Europe in absolute terms. It is mainly oriented towards financial intermediation (rather than directly participating in the financial markets) and as a result banks are the dominant type of financial institutions with other types of non-bank financial intermediaries being relatively unimportant (for further details see Peat, 1986 and Schneider-Lenne, 1993). All banks in W. Germany are controlled and supervised by the German Federal Banking Supervisory Authority which, in turn, reports to the Federal Ministry of Finance. The Federal Banking Supervisory Authority makes sure all banks comply with the existing rules and regulations and issues banking licenses for new financial institutions. This central agency can also exercise limited banking policy by issuing certain regulations about equity and liquidity requirements. The Bundesbank on the other hand, has the responsibility of planning and conducting monetary policy and acts as banker to the federal government and to the rest of the banking system. It also receives all bank reports and accounts and then transfers them to the Federal Banking Supervisory Office (FBSO) along with its comments and observations.

The following table (Table 2.13) shows some of the major indicators of the W. German banking system.

The W. German banking system may be characterized as overbanked. By year-end 1993, there were 4,038 banks operating 53,156 branches nationwide (by far outnumbering bank branches in the U.K, 11,878). Hence, the number of inhabitants per branch was substantially small, only 1,175. Finally, the number of bank personnel increased by almost 28,000 during the period 1984-93 along with the ratio of bank employees to total population (from 0.93 to 0.95 by year-end 1993).

Table 2.13. Some major indicators of the W. German banking system.

	1984	1990	1993
Population (mil.)	61.2	61.8	62.5
Number of banks	4,701	4,580	4,038
Total branches	44,583	48,133	53,156
Number of ATM's	na	12,945	14,687
Population per branch	1,373	1,284	1,175
Population per ATM	na	4,774	4,255
Bank employees (thous.)	571.8	585	599
Bank employees as °o of total population	0.93	0.94	0.95

Source: Deutsche Bundesbank: Monthly Reports and Statistical Reports (March 1985, 1991, 1994).

Banks in W. Germany can be classified into the following categories:
a). Commercial banks, b). Regional banks, c). Private banks, d). Foreign banks, e). Savings banks, f). Cooperative banks and g). Specialized banks.

Commercial banks.

Commercial banks are universal-type institutions offering all banking services in addition to securities and brokerage services. At year-end 1994, there were 336 commercial banks accounting for 35.8 percent of total banking sector assets. The largest commercial banks in W. Germany are: Deutsche Bank, Dresdner Bank and Commerzbank (the so called Grossbanken)[22]. These banks play an important role not only in the banking sector but in the W. German economy generally, through their involvement and direct investment in large industrial enterprises[23].

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22. These three banks alone operate more than 3,000 branches nationwide and hold almost 10 percent of total domestic banking sector assets at year-end 1994.

23. Swary and Topf (1992) point out that W. German banks are involved in the operations of big industrial conglomerates (usually by being represented in the boards of directors) in two ways: firstly through direct investment and secondly by exercising the voting rights of shares through the permission of the enterprises' shareholders (the shares in question are the ones deposited in the bank). For example, Deutsche Bank partly owns companies such as Volkswagen and Siemens.

The banks' involvement in the affairs of W. German industrial corporations is significant. Cable[24] (1985) has calculated that "the overall proportion of votes in the top 100 companies controlled by the banks rises to 36 percent". Cable suggests that this considerable degree of influence might lead to the emergence of serious conflicts of interest between the banks and industrial companies or to potential abuse of the banks' power. Consequently, the organisation and development of a large number of corporations is somewhat dependent on the decisions of management boards across the banking system. Moreover, the degree of competition among W. German banks is reduced (to a small extent), since a large number of non-financial companies "are condemned" to be doing business with a particular bank and cannot switch banks as easily as they might have done had the circumstances been changed.

However, W. German banks have recently (1985-1990) reduced their involvement in the operations of non-financial firms (especially in cases where bank ownership exceeded 25 per cent of a non-financial company's holdings) as a result of the introduction of various rules and restrictions by the W. German authorities (see **Journal of Banking and Finance**, 1992, Special Edition on Universal Banking). Thus, the degree of competition among W. German banks may have been slightly strengthened.

In general, commercial banks, during the period 1980-94, increased their involvement in international, investment banking and off-balance-sheet activities, hence, offsetting the decline of their involvement in more traditional banking services.

Big banks. Although, the three big banks significantly increased their share of total domestic loans (from 7.8 percent in 1984 to 8.5 percent in 1994), their share of total banking sector deposits changed only negligibly from 10.2 to 10.3 percent in 1994. They also accounted for 10.4 percent of securities issuance and 2.2 percent of total W. German bonds outstanding at year-end 1994 (see Table 2.15).

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[24]. J. Cable, "Capital market information and industrial performanc: The role of W. German banks", **Economic Journal**, Vol. 95, p.p 118-132.

Table 2.14. The W. German banking system by categories of banks.

	Number of banks			Total assets (DM bil)			%
Type of banks	1984	1990	1994	1984	1990	1994	1994
Commercial banks	247	334	336	656	1,168	1,666	35.8
Big banks[a]	6	6	3	242	463.2	624.2	13.4
Regional banks	103	185	199	306	566.7	883.7	18.9
Private banks	76	83	71	36	62.3	69.2	1.4
Foreign banks	62	60	63	72	76.2	89.8	1.9
Savings banks	603	575	657	1,153	978.9	1,427	30.6
Cooperative banks	3,716	3,049	2,666	479	563	825.2	17.7
Specialized banks	135	16	18	726	323.6	734.2	15.7
Total banking system	4,701	4,040	3,727	3,014	4,670	4,654	100.0

Source: Deutsche Bundesbank Monthly Reports (March 1985, March 1991, March 1995).
Notes: A bank's total assets include all its claims on others (such as loans), all investments (government securities, Treasury Bills) and its fixed assets (buildings and equipment).
a). Including the three big banks' subsidiaries in Berlin.

Regional banks. Despite their name, these banks are not restricted to a certain region, but often have branches in more than one state and a few of these institutions are represented internationally as well (Bayerische Vereinsbank, Bayerische Hypobank etc). All W. German regional banks are legally considered limited liability entities (AG, GmbH and KGaA). There were 199 such institutions at year-end 1994 holding 18.9 percent of total banking sector assets (see Table 2.16). This grouping accounts for 12.6 percent of total domestic loans and 12.5 percent of total deposits by year-end 1994.

Private banks. Private banks are sole proprietorship institutions and are classified as commercial banks[25]. By year-end 1994, there were 71 private banks in operation, accounting for 1.4 percent of total banking assets. Most banks of this type, generally specialize in off-balance-sheet activities such as portfolio management, foreign trade

[25]. The latest Banking Act of 11 July 1985 no longer permits the establishment of private banks.

financing, trustee services etc. This grouping of commercial banks is also relatively unimportant, holding minimal shares of major balance sheet items. Private banks usually specialise in activities such as securities trading, foreign exchange and bill discounting and therefore are quite similar to British merchant banks (see Table 2.15). Many private banks have been taken over by larger banks (the number of private banks has diminished over the last few years) which use them to conduct business with wealthy private clients (Molyneux 1996).

Foreign banks. Foreign banks operate 63 branches in W. Germany and hold only 1.9 percent of total assets at year-end 1994. These institutions mainly provide services to foreign owned companies or their subsidiaries. Foreign, regional and foreign banks are usually classified as commercial banks.

This category of W. German banks holds very small shares of total domestic loans and deposits. Foreign banks mainly engage in international operations, interbank lending, payment services, trade financing and other investment banking activities (see Table 2.15).

Savings banks. Most savings banks (Sparkassen) are owned by regional governments or local governments and are usually restricted in certain local areas. There are 11 central savings banks (Landesbanken) throughout W. Germany, serving as central monetary institutes for the savings banks (regional money center banks). Savings banks play a very important role in the W. German money market and mainly conduct their business with the authorities of the federal states (Lander), although they are increasingly expanding their activities into wholesale and international banking. At year-end 1994, there were 657 savings banks in W. Germany operating more than 18,000 branches and holding 30.6 percent of total domestic banking sector assets (hence being the biggest and most significant grouping of banking institutions in W. Germany).

Savings banks account for 25.3 percent of total banking sector deposits and 20.5 percent of total loans by year-end 1994. They also hold a very large securities portfolio (26.6 percent of total W. German securities in 1994).

Cooperative banks. Although, the number of registered cooperative banks in W. Germany decreased by more than 1000 institutions during the period 1984-94, they still hold 17.7 percent of total W. German banking assets and operate more than 19,000 branches nationwide at year-end 1994. The aim of the credit cooperatives is to support their members which include medium-sized firms as well as individuals (mostly farmers in the case of agricultural cooperatives). Nowadays, both types of credit cooperatives (urban banks - Volksbanken- and agricultural banks -Raiffeisenbanken) serve all kinds of customers.

Cooperative banks decreased their shares of total banking sector deposits during the period 1984-94, and by year-end 1994 they hold 14.9 percent of total deposits (from 18.7 percent ten years earlier) and 11.8 percent of total loans (hardly changed from 11.9 percent in 1984) (see Table 2.15).

Specialized banks. The most important specialized banks are the 34 mortgage banks (mainly providing house finance to depositors). The rest of the specialized banks may be categorized into the following types: *Investment companies,* which are primarily involved in the securities markets and real estate financing. *Installment credit institutions*, which mainly deal with consumer loans and medium-term industrial loans and *Guarantee banks*, which have been created by commercial and savings banks or regional chambers of commerce with a main purpose of extending guarantees to small and medium-sized enterprises in order to ensure their financing from larger institutions.

W. German Post office and Postal giro, which offers money transfer services and savings accounts through a branch network of nearly 19,000 branches nationwide.

Special Purpose banks, which were formed to serve specific banking activities such as the trade financing of imports and exports, agricultural development financing, aasisting small and medium-sized businesses, financing regional environmental projects etc.

The specialized banks sector in W. Germany shrank quite substantially during the last decade. At year-end 1994, there were only 18 specialized banks (down from 135 in 1984), operating 175 branches but holding 15.7 percent of total banking assets. This category of banks holds only 10.6 percent of total banking sector loans and 9.0 percent of total deposits at year-end 1994 (see Table 2.15).

Mortgage banks. Mortgage banks' share of total deposits has declined from 8.0 percent in 1984 to 6.7 percent in 1994. They also hold 14.8 percent of total loans at year-end 1994 and a substantial 13.8 percent of total bonds outstanding.

Table 2.15 shows the balance sheet structure of W. German banks by categories of institutions. During the last decade W. German banks expanded by more than 54 percent (total assets growth).

Table 2.15. Major items in the balance sheet of W. German banks by categories of institutions (DM bil.).

Type of banks	Total loans[a]	%	Securities	%	Total deposits[b]	%	Bonds	%
Big banks								
1984	151	7.8	25.9	7.5	153	10.2	11.4	1.8
1990	411.3	9.3	27.6	14.3	375	10.8	26.8	3.2
1994	563.6	8.5	52.3	10.4	508.4	10.3	31.9	2.2
Regional banks								
1984	197	10.2	33.4	9.6	133	8.8	60.0	9.7
1990	528.8	12.0	35.1	18.1	420.5	12.1	87.6	10.4
1994	832.7	12.6	67.6	13.5	611.9	12.5	160.5	11.2
Foreign banks								
1984	22.7	1.2	6.4	1.8	7.1	0.5	-	-
1990	74.5	1.7	3.1	1.6	71	2.0	-	-
1994	87.4	1.3	4.8	0.9	84.8	1.7	-	-
Private banks								
1984	20.6	1.1	5.9	1.7	19.9	1.3	-	-
1990	58.0	1.3	3.1	1.6	56.1	1.6	0.5	0.05
1994	64.8	0.9	4.6	0.9	60.7	1.2	1.6	0.11
Savings banks								
1984	446	23.2	126	36.3	540	35.9	3.1	0.5
1990	913.4	20.7	40.6	21.0	865.2	24.9	40.5	4.8
1994	1,352	20.5	133.3	26.6	1,239	25.3	77.0	5.4

Cooper. banks								
1984	229	11.9	50.9	14.7	281	18.7	2.4	0.4
1990	523.9	11.9	20.7	10.7	512.4	14.7	13.0	1.5
1994	777.0	11.8	98.6	19.7	728.5	14.9	34.6	2.4
Mortgage banks								
1984	369	19.2	3.9	1.1	120	8.0	242	39.1
1990	599.4	13.6	6.2	3.2	295.1	8.5	276.5	32.8
1994	807.7	12.2	14.8	3.0	330.0	6.7	451.5	31.5
Special. banks								
1984	105	5.5	8.5	2.4	85	5.6	38.5	6.2
1990	316.3	7.2	5.6	2.9	213.4	6.1	84.2	10.0
1994	702.9	10.6	43.7	8.7	438.8	9.0	198.1	13.8
All types of banks								
1984	1,924	100.0	347	100.0	1,506	100.0	619	100.0
1990	4,394	100.0	193	100.0	3,469	100.0	840	100.0
1994	6,581	100.0	500.3	100.0	4,887	100.0	1,428	100.0

Source: Deutsche Bundesbank Monthly Reports (March 1985, March 1991, March 1995).
Notes: a). This figure does not include loans to other financial institutions and b). This figure does not include interbank deposits. It is the total private and public sector deposits.

Performance and capital adequacy measures of W. German banks.

Table 2.16 presents performance and capital adequacy measures for five of the biggest W. German banks for the period 1985-1994.

Deutsche Bank has the highest profit rates among this sample of banks, showing the highest pre-tax profits to assets and pre-tax profits to capital ratios for each and every year between 1985 and 1994. The worst results were displayed by DG bank (except in 1992), while the profit rates of the rest of the banks were quite similar. During 1987 and 1990, the banks' provisions for bad and doubtful loans increased substantially and this is reflected in the profit rates of all banks during these years.

Table 2.16. Performance and capital adequacy measures for five big W. German banks.

	1985	1986	1987	1988	1989	1990	1992	1994
Pre-tax profits/total assets								
Deutsche Bank	1.09	1.10	0.62	1.06	1.03	0.61	0.76	0.55
Dresdner Bank	0.53	0.55	0.49	0.48	0.54	0.54	0.49	0.43
Commerzbank	0.51	0.51	0.49	0.41	0.55	0.48	0.6	0.50
Bayerische Vereinsbank	0.42	0.47	0.43	0.42	0.41	0.35	0.34	0.34
DG Bank	0.38	0.27	0.39	0.32	0.29	0.26	0.47	0.15
Capital/total assets								
Deutsche Bank	3.99	3.93	4.06	3.80	4.18	3.89	3.72	3.55
Dresdner Bank	2.82	3.24	3.24	3.30	3.68	3.39	3.06	3.49
Commerzbank	2.81	3.33	3.13	3.10	3.37	3.50	4.04	2.95
Bayerische Vereinsbank	2.22	2.44	2.37	2.50	2.42	2.57	2.54	2.46
DG Bank	2.23	2.13	2.15	2.20	2.43	2.72	2.9	2.40
Pre-tax profits/capital								
Deutsche Bank	27	27	15	29	27	16	21.2	15.7
Dresdner Bank	18	17	14	15	16	16	16.2	13.2
Commerzbank	17	15	15	14	17	15	15.7	19.0
Bayerische Vereinsbank	18	19	17	18	17	15	14.0	15.1
DG Bank	15	12	17	15	15	11	20.1	6.4

Source: **The Banker's** Top 500 banks (Issues of 1986, 1987, 1988, 1989, 1990, 1991, 1993, 1995).

In relation to capital assets ratios, there is a notable increase for all five banks during the period 1987-92. The highest ratios are displayed by Deutsche and Dresdner banks, while the lowest ratios are those of the DG and Bayerische Vereinsbank banks. These capital adequacy measures are slightly better than the corresponding measures for the French banks (see Table 2.12), but compare poorly with the London clearing banks' capital assets ratios (6 and 7 percent in some cases, see Table 2.9)[26].

[26]. However, W. German banks tend to underestimate the true value of their capital ratios, because of substituting hidden values on their equity holdings.

2.3.6 *Cross-country comparisons and concluding remarks.*

The W. German banking system is characterised as overbanked. By year-end 1993, there were 4,038 banks operating a huge number of 53,156 branches (1,175 inhabitants per branch). The number of authorised banks in the U.K and France is much smaller (574 and 610 banks respectively by 1993). British banks operated 11,878 branches (4,874 inhabitants per branch). W. German banks had the smallest number of ATM's (14,687 in 1992), whereas British and French banks had acquired 18,296 and 17,324 ATM's respectively making the W. German banks the least modernised (based solely on this indicator). W. German banks sustained the largest workforce as a percentage of total population 0.95 per cent, compared with 0.84 and 0.47 for British and French banks respectively (Table 2.17).

An examination of pre-tax profits to total assets ratios for the largest British, W. German and French banks over the period 1982-94 (Table 2.18) shows that British banks consistently outperformed their competitors in France and W. Germany by a clear margin. The reported ratios for British banks are around 1 per cent for almost all the years shown in the table (some ratios above 1 per cent, some ratios just below 1 per cent). The profit ratios of the French banks are quite poor, ranging from 0.21 to 0.59. Similarly, W. German banks' profit rates range from 0.26 to 0.54, with the exception of Deutsche Bank whose profit rates were higher (around 1 per cent). The difference in the relative performance of British, French and W. German banks may be partly explained by the fact that the U.K experienced the adverse recessionary effects in its economy (with a subsequent effect on banking profitability) earlier (1990-91), in contrast with France and W. Germany (1991-92). Nevertheless, British banks appear to have performed better than French and W. German banks during the period 1982-1994).

Table 2.19 reports capital to assets ratios for the biggest British, W. German and French banks for the period 1985-94. The picture is again quite clear; the British banks report the highest capital to assets ratios, ranging from 7.4 to 13 per cent making them the most sound banks in our three country sample. The French banks' capital to assets ratios range from 1.23 to 3.59 per cent; CNCA is the most sound among the French banks with ratios consistently above 4 per cent (up to 5.22 per cent). The W. German banks' capital to assets ratios are very similar with the French banks' ratios. The highest ratios are reported for the Deutsche Bank (around 4 per cent).

As far as the issue of comparability of these reported figures is concerned, we are confident that these figures are comparable and indeed are indicative of the different structure and performance characteristics that prevail in the three countries under investigation. There are certain differences in accounting techniques for reporting balance sheet and profit and loss account items across European countries. There may also be differences in definitions and other interpretational issues. For instance, there are differences in the reporting and identification of risk capital in the three countries (see next chapter), but these are not significant and we may still draw conclusions about the relative soundness of banking institutions in the three countries[27].

Table 2.17. Major indicators of the three national banking systems (1993).

	U.K	France	W. Germany
Population (mil).	57.9	56.8	62.5
Number of banks	574	610	4,038
Number of branches	11,878	na	53,156
Population per branch	4,874	na	1,175
Number of ATM's	18,296[a]	17,324[a]	14,687[a]
Population per ATM	3,164	3,278	4,255
Bank employees (thous.)	486	268	599
Bank employees as a % of total population	0.84	0.47	0.95

Sources: Bank of England Quarterly Bulletins (various issues), Bank of France Quarterly Statistical Bulletins (various issues) and Deutsche Bundesbank Monthly and Statistical Reports (various issues). Notes: a). 1992 figures

27. The E.U Commission itself has recognised this caveat and with the Council Directive of 8 December of 1986 proposed a universal form for all banks' balance sheets, profit and loss accounts, consolidated accounts and notes on the accounts and clearly sets out the appropriate layout and terminology (see next chapter).

Table 2.18. Performance measures for the biggest British, French and W. German banks.

Banks	1982	1984	1986	1988	1990	1992	1994
Pre-tax profits / assets (%)							
Bank of Scotland	1.3	1.0	1.2	1.2	1.1	0.43	1.32
Barclays	0.8	0.9	1.1	1.3	0.6	-0.16	1.14
Lloyds	1.0	1.1	1.5	1.8	1.1	1.46	1.60
Midland	0.5	0.2	0.8	1.2	0.0	1.00	1.57
National Westminster	0.8	0.9	1.2	1.4	0.4	0.28	0.67
Royal Bank of Scotland	1.0	1.0	1.1	1.4	0.9	0.06	1.17
BNP	-	0.35	0.54	0.44	0.21	0.24	0.21
Credit Lyonnais	-	0.37	0.48	0.45	0.53	-0.02	-0.57
Societe Generale	-	0.25	0.55	0.59	0.35	0.37	0.40
CNCA	-	-	0.36	0.49	0.45	0.54	0.56
Deutsche Bank	-	0.87	1.10	1.06	0.61	0.76	0.56
Dresdner Bank	-	0.53	0.55	0.48	0.54	0.49	0.43
Commerzbank	-	0.46	0.51	0.41	0.48	0.60	0.50
Bayerische Vereinsbank	-	0.40	0.47	0.42	0.35	0.34	0.34
DG Bank	-	0.31	0.27	0.32	0.26	0.47	0.15

Sources: **British Banker's Association**, Annual Abstract of Banking Statistics (Vol. 8, May 1991), and the **Banker's** Top 500 Banks (Issues of 1985, 1986, 1987, 1988, 1989, 1990 and 1991, 1995).

Table 2.19. Capital/assets ratios for the biggest British, French and W. German banks.

Capital/assets (%)	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1992**	**1994**
BNP	1.98	3.15	3.17	2.8	2.67	3.23	3.59	3.84
Credit Lyonnais	1.23	1.91	2.69	3.0	2.67	3.41	3.04	2.66
Societe Generale	2.03	2.90	2.83	3.4	3.36	3.01	3.10	3.21
CNCA	4.26	4.36	4.08	4.4	4.88	4.35	5.22	5.27
Deutsche Bank	3.99	3.93	4.06	3.80	4.18	3.89	3.72	3.55
Dresdner Bank	2.82	3.24	3.24	3.30	3.68	3.39	3.06	3.49
Commerzbank	2.81	3.33	3.13	3.10	3.37	3.50	4.04	2.95
Bayerische Vereinsbank	2.22	2.44	2.37	2.50	2.42	2.57	2.54	2.46
DG Bank	2.23	2.13	2.15	2.20	2.43	2.72	2.90	2.40
Bank of Scotland	-	-	-	-	11.0	10.6	4.22	4.43
Barclays	-	-	-	9.3	9.0	8.3	4.00	4.00
Lloyds	-	-	-	10.1	7.4	8.5	5.01	4.73
Midland	-	-	-	11.8	10.0	9.8	4.58	5.71
National Westminster	-	-	-	9.8	9.1	9.1	3.89	3.53
Royal Bank of Scotland	-	-	-	13.0	12.8	11.6	5.10	4.10

Source: **The Banker's** Top 500 banks (Issues of 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1995) and **British Banker's Association**, Annual Abstract of Banking Statistics (Vol. 8, May 1991).

Notes: The considerable decrease of the capital/assets ratios observed for British banks between 1990 and 1992 is due to the use of two different definitions for the estimation of these ratios before 1990 and in 1992. The figures for the years up to 1990 are for the ratios of total capital base total assets and Total Capital Base = Shareholder's Funds + Minority Interests + Loan Capital + General Provisions.

2.4 Market structure and the regulatory environment.

2.4.1 *The structure-performance relationship*

The preceding part of this chapter examined market structure and performance characteristics of the British, French and W. German banking systems. Market structure and performance are two important features of industrial organisation analysis that are employed in an effort to understand how markets operate and is the influence of various economic determinants on the development and evolution of different market characteristics. Do changes in market structure (more or less competitive environments) affect the profits of banking institutions and by how much? Do banks operating in more highly concentrated markets charge higher prices for their products and services (higher interest rates on loans and lower interest rates on deposits) than banks operating in less concentrated markets?

Numerous studies have tried to tackle these important issues, which constitute a large part of academic research that is universally known as the structure-conduct-performance literature. Authors on banking organisation relate market structure to a number of performance characteristics such as interest rates paid on deposits and charged on loans, operating income, operating expenses, different measures of profits etc (an extensive literature review is included in Chapter 4), and attempt to evaluate causal relationships.

Studies on the structure-conduct-performance (scp) paradigm, apply the widely used industrial organisation economic principle, that the degree of competition among firms in a market is influenced by the degree of concentration in that market. Markets that are dominated by a few very large firms are less competitive than markets where the number of players is great, since effective collusion becomes much more difficult. Consequently, firms in less competitive environments charge higher prices and reap monopolistic profits. This framework has been widely applied to various industries including the banking industry.

The first empirical investigations on the market structure-performance relationship were carried out by Bain in the 1950's (Bain 1951, 1956). Bain (1951) tried to determine the nature of the impact of concentration on market power by distinguishing between concentrated and unconcentrated industries among his sample of 42 U.S industries. Bain found that concentrated industries averaged higher rates of return on equity compared with unconcentrated industries (11.8 and 7.5 percent respectively). In his later study, Bain (1956) in an effort to incorporate the effect of entry barriers in his analysis, divided 20 U.S industries into different concentration groups as well as into categories according to the existing degree of entry barriers (very high, substantial and moderate to low entry barriers industries). Bain found that large firms operating in industries with high entry barriers earn higher rates of return than large firms in industries with lower entry barriers and suggested that the higher the entry barriers and the greater the concentration, the greater large firm profitability will be.

There have been numerous studies that have aimed to test the structure-conduct-performance (s-c-p) relationship in banking. Gilbert (1984) provides a detailed review of the s-c-p literature and suggests that it contains too many inconsistenciies and contradictions and therefore one may not draw definitive conclusions about the impact of market structure on bank performance. Gilbert has observed that in many studies the relationship between concentration and bank performance measures (i.e: loan rates, deposit rates and profitability measures) are found to be statistically insignificant, but even when a statistically significant relationship is reported, the impact is quantitatively very small (a 10 percent increase in market concentration causes changes on loan rates of between 0.1 and 18 basis points). Gilbert has also correctly pointed out certain shortcomings in the construction of performance variables that may produce biased results (a detailed literature review is presented in Chapter 4).

These numerous empirical studies that have sought to estimate the relationship between market structure and bank performance were not, however, based on an explicit model of the banking firm. Hannan (1991), however, tries to formally derive and critically assess the most widely tested relationships in this literature by employing a neoclassical portfolio choice model of asset allocation originally developed by Klein (1971). The solution of such a model of the banking firm implies that bank profits and bank prices (loan and deposit rates) are affected by the prevailing level of concentration of each market in which the bank operates. Hannan's work was the first attempt at providing a formal and explicit theoretical framework for the empirical investigation of s-c-p studies; however, his hypothesis is a supposition that (at least to my knowledge) has not been empirically investigated. One of the three aims of this thesis is to empirically test Hannan's hypothesis.

2.4.2 *A note on rules and regulations affecting structure.*

The framework of rules, regulations and supervisory controls that are in existence in different banking markets influence European banking market structures in their evolution and development. Banking laws precisely define the scope and the area of permissible activities that banks may engage in and these laws vary between European banking systems. Regulatory authorities are also able to influence the structure and size of the system by exercising their discretionary powers in granting banking licenses. Moreover, the state which ultimately dictates the rules of the game by controlling the appropriate authorities and by passing the relevant legislation may actively participate in the banking sector by nationalising or renationalising private institutions. Consequently, it is evident how this complex set of rules and controls plays a pivotal role in shaping the market structure of national European banking systems.

Furthermore, the development and evolution of European banking market structures was greatly influenced by banking legislation introduced by the E.U Commission since 1965 with the aim to enhance competition between banking institutions and harmonise regulations across different member states. The first important piece of legislation proposed by the E.U Commission was the Directive on the Abolition of Restrictions on Freedom of Establishment and Freedom to Provide Services in Respect of Self-employed Activities of Banks and other

Financial Institutions (July 1965). This Directive clearly sets out the rules and conditions that all banks have to adhere to and furthermore, introduces the same equal treatment to foreign and domestic banking institutions alike with regards to opening up branches in a particular banking market. Additionally, subsidiaries of foreign non-E.U banks are treated as E.U banks in every way and have the same rights and same obligations.

The first big step towards the harmonisation of rules and regulations across E.U banking markets was taken in 1977 when the First Banking Co-ordination Directive was adopted (First Directive on the Co-ordination of Laws, Regulation and Administrative Provisions Relating to the Taking-up and Pursuit of Credit Institutions). This Directive provides a clear and unequivocal definition of what constitutes a credit institution: " The undertaking whose business is to receive deposits and other repayable funds from the public and to grant credit for its own account" (Article 1). The supervision of credit institutions that operate in more than one member states is the responsibility of the appropriate authorities of the home country of the parent bank (the country where the parent bank is based-home country control principle).

Progress towards greater harmonisation was achieved with the adoption of three more Directives during the next ten years. These were: the Directive on the Supervision of Credit Institutions on a Consolidated basis (proposed in 1981, adopted in 1983), the Directive on a Uniform Format for Bank Accounts (adopted in 1986) and the Directive on Consumer Protection (also adopted in 1986).

However, all the measures and rules introduced during the last thirty years fell short of furthering the main original objective of the 1957 Treaty of Rome which was the transformation of segmented European national markets into a truly unified single market. Therefore, the E.U Commission reiterated its determination to push forward with the establishment of the Single European Market (SEM) with the publication in 1985 of its White Paper on the completion of the internal market by 1992. The White Paper proposes that all physical, technical and fiscal barriers distorting trade between member states in all industries be abolished by 1 January 1993. As regards the banking industry, the White Paper advocates full freedom to provide banking services across different member states and calls for the principles of a single banking licence, home country control and mutual recognition to be universally adopted by all states. Once a credit institution is authorised to operate in one member country it can set up business anywhere in the E.C without having to apply for further authorisation. The aforementioned principles were formally put forward by the E.U Commission in the 1988 proposal for a Second Banking Co-ordination Directive which was adopted by the E.U Council of Ministers on 15 December 1989. The Own Funds Directive and the Solvency Ratio Directive were also adopted in April 1989 and December 1989 respectively in order to harmonise definitions of bank capital and calculations of solvency ratios throughout the E.U (the E.U legislative programme and all Banking Directives will be discussed in much more detail in Chapter 3).

2.4.3 *Size and concentration.*

Apart from organizational differences, most European banking markets are dominated by a few "core" banks and the rest of the market is shared by a large number of various credit institutions. Table 2.20 presents market concentration and size measures for different European countries.

Table 2.20 indicates that the German, French, British and Italian banking systems are the biggest in the E.U (size is measured by total assets). Germany, Spain, Italy and France are characterised by large numbers of mutual and co-operative banks with strong regional presence. Germany has by far the biggest number of banks (4038) and Portugal the smallest (only 27). In addition to the large number of banks operating in Germany, there are also a substantial number of non-banks like credit card companies and insurance companies which offer a wide and expanding range of financial products, therefore, accentuating the degree of competition in the German banking system (see Schneider-Lenne (1993)).

Table 2.20 also shows that concentration ratios differ widely among European countries. Among the largest E.U member states, the U. K and France have the most concentrated banking markets and Italy and Germany the least concentrated banking markets in 1993. As far as the rest of the E.U is concerned, the Netherlands, Greece and Denmark are the most concentrated markets and Luxembourg is the least concentrated market. Moreover, between the years 1990 and 1993, we observe a very substantial increase in the level of concentration in the U. K of more than 10 percentage points[28] and in Belgium of more than five percentage points. By contrast, decreases are apparent in Italy, Luxembourg and France.

Table 2.20. Market concentration in European banking systems (market share of the five largest banks as a percentage of total assets).

Country	1987	1988	1989	1990	1993	Total Assets ECU (mil) 1993	Number of banks 1993
Belgium	58.2	57.5	57.9	54.9	59.3	379833	121
Denmark	na	74.3	77.1	na	73.5	na	113
France	42.8	42.8	42.8	45.0	41.2	1500174	610
Germany	24.6	25.7	26.3	27.4	27.2	3473104	4038
Greece	63.7	62.3	63.4	na	77.6	na	na
Italy	39.1	41.1	44.5	43.0	35.6	1676000	1637
Luxembourg	25.4	26.8	25.9	24.7	29.9	na	na
Netherlands	86.8	90.4	83.7	84.1	84.4	560925	177
Portugal	na	na	56.4	na	55.8	na	27
Spain	33.2	38.7	38.8	41.8	45.0	1383869	319
U. K	na	29.0	29.1	27.8	38.1	1929456	574

Source: Gual and Neven (1993).

[28]. This large rise in the U. K's concentration ratio is mainly due to the inclusion of Hong Kong and Shangai Bank Corporation's consolidated figures in the calculation of the ratio. However, recent developments such as the takeover of Cheltenham and Gloucester Building Society by Lloyds Bank and the proposed merger between the Halifax and Leeds Permanent Building Societies and the increasing pressures to restructure will further enhance concentration in the U. K market.

2.5 Why structure-performance issues matter in European banking.

2.5.1 *European integration and economic gains.*

The transformation of the European industry resulting from the gradual lifting of existing barriers to freedom of entry and exchange controls on capital movements is expected to bring about substantial economic gains both of a microeconomic and macroeconomic nature. The first significant microeconomic effect will be a reduction in costs stemming from the removal of a wide variety of physical and technical barriers that exist in the trade of goods and services. The opening-up of all E.U national markets will inevitably lead to unrestricted competition between E.U firms, the exploitation of economies of scale and the elimination of X-inefficiencies, thus, resulting in further reductions in the prices of goods and services[29]. In turn, lower prices are expected to cause an increase in demand for these products and services and consequently an increase in output. Firms increasing their levels of output may be able to reduce costs even further by exploiting economies of scale if indeed such economies do exist.

The main beneficiary reaping the benefits that will follow from the establishment of the internal market will be the European consumer who will be rewarded with better and cheaper products and services. Greater competition is also expected to lead to the creation of new products and services as the need to innovate and gain competitive advantages over rivals is increased.

However, these desirable effects may be substantially diminished or even reversed if enhanced competition forces many firms out of the market because they can no longer compete in the free market due to inefficiencies in production and/or organisation. In this case "survival of the fittest" may result in reducing the overall number of firms in the market,

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[29]. Revell (1985), Stevenson (1986), Arthur Andersen (1986), the OECD (1989) and Gardener (1990) all agree that competition is increasing and will be increased further among commercial banks and financial institutions in general and identify the forces and trends already prevalent in many European banking systems that bring about ever more strengthening competitive pressures

thus lessening rather than strengthening competition. This process may be accentuated by mergers and/or acqusitions between European firms as the smaller players seek out partners and/or protectors in order to face the new market environment.

Market integration is also expected to lead to significant macroeconomic gains as well. Lower prices are widely expected to positively influence E.U output and hence accelerate E.U-wide economic growth, ease unemployment and reduce government budget deficits (where the increase in spending is less than proportionate than the increase in government revenue). Furthermore, lower inflation rates will bring about lower interest rates and this effect will encourage investment both public and private and therefore cause further increases in economic growth.

These expected economic gains also apply to the banking industry as well as to other industries. In addition to the aforementioned microeconomic effects, the single market for financial services is expected to benefit the E.U economy as a whole. The full liberalisation and integration of European capital markets will work towards the elimination of those distortions and negative effects that stem from the misallocation of capital resources. Capital will move freely across national borders seeking the highest returns possible. It will have access to a wider range of markets and investments and therefore better allocation will result in attaining greater economic efficiency for the whole of the economy. Furthermore, full integration of capital markets will bring forward ever more converging real interest rates across the E.U with all the positive consequences that are associated with such an outcome.

The E.U Commission empirically evaluated these views with the publication of the renowned Cecchini Report (discussed in the following sections). Moreover, Gardener and Teppet (1990, 1991) replicate the Cecchini study's methodology in an attempt to quantify the effect of integration between EFTA and E.U countries. The authors suggest that the gains from such a development would be significant and under certain conditions would be even higher than the gains envisaged in the Cecchini study for European member states. Molyneux et. al. (1993) reached the same conclusion by adopting a different approach. They found that monopolistic competition was prevalent in the banking markets of Germany, the U.K, France and Spain between 1986 and 1989 and therefore, integration of European banking markets may bring about all the gains associated with the reduction of barriers and enhanced competition.

2.5.2 *The E.U Commission Cecchini Report.*

The E.U Commission set up the Cecchini Committee (taking the name of its chairman Paolo Cecchini) with the sole purpose to try and quantify the expected gains that will result from the creation of the internal market. This effort produced a voluminous report that became known as the Cecchini Report[30]. The microeconomic study of the financial services sector was undertaken by Price Waterhouse Management Consultants on behalf of the Cecchini Committee. The next two sections discuss the aims and methodology of this study and report its basic findings.

2.5.3 *Aims, methodology and results of the Cecchini (Price Waterhouse) Report.*

The principal aim of the study was to quantify the economic effects of the establishment of the Single European Market on the financial services sectors of eight E.U countries (France, Italy, W. Germany, U.K, Belgium, Netherlands, Luxembourg and Spain). It was hypothesized that the creation of the Single Market would bring about significant economic gains (consumer surplus gains) as prices for banking products and services will fall to a level equal to the average of the four lowest prices prevailing in the countries under investigation for each product and service.

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[30]. E.U Commission, **Research on the "Costs of Non-Europe". Basic findings**, Vol.9. This volume deals with the financial services sector and other areas are extensively covered in the rest of the 16 volumes of the study (such as automobiles, foodstuffs, clothing, pharmaceuticals, telecommunications etc).

Sixteen different financial products and services (banking, insurance and brokerage) were included in this study: consumer credit, credit cards, mortgages, letters of credit, foreign exchange drafts, travellers cheques, commercial loans (banking), life insurance, home insurance, motor insurance, commercial fire and theft, public liability cover (insurance), private equity transactions, private gilt transactions, institutional equity transactions and institutional gilt transactions (brokerage).

2.5.4 *Results and limitations of the Cecchini Report.*

The authors of the study calculated theoretical potential price reductions for the sixteen financial products and services that were included in their sample. Prices for each product and service were assumed to fall to a level equal to the average of the four lowest prices observed in this sample of eight countries. It was suggested that price falls for banking products were expected to be the largest in W. Germany and Spain (33 and 34 per cent respectively) and the lowest in Belgium, Luxembourg and the Netherlands (15, 16 and 10 per cent respectively). These theoretical potential price reductions were then scaled down to yield the expected indicative price reductions for all financial products. These new figures were estimated after taking into consideration gross margins and administrative costs in all financial services sectors (banking, insurance and brokerage) in each country under investigation.

These adjusted figures (indicative price reductions) appear to suggest that expected price falls for financial services as a whole would be the largest in Spain and Italy (21 and 14 per cent respectively) and the lowest in the Netherlands and the U.K (4 and 7 per cent respectively). These estimated price falls as Molyneux et al. (1993) argue appear to be the largest in countries that had been historically more heavily regulated and hence less competitive. These price falls were then used to estimate the likely impact on the value-added of the financial services sector and the expected gains in consumer surplus.

Table 2.21 presents the results of the estimation of expected economic gains stemming from the establishment of the Single European Market in financial services. The biggest gains in consumer surplus were reported for Spain and Luxembourg (1.5 and 1.2 per cent of GDP respectively), whereas the lowest gains would accrue to the Netherlands and France (0.2 and 0.5 per cent of GDP respectively). The overall gain in consumer surplus for the eight countries in the sample amounted to 0.7 per cent of their combined GDP. The expected impact on value-added were substantial and the reported figures were also in accordance with the estimated gains in consumer surplus.

Table 2.21. Estimated gains in consumer surplus and on value-added for the financial services sector in eight European countries.

Countries	Average indicative. price reduction °o	Direct impact on for financial ECU ml.	value-added services °o of GDP	Gain in as a result of price reduction ECU ml.	consumer surplus average indicative °o of GDP
B	11	656	0.6	685	0.7
D	10	4,442	0.5	4,619	0.6
E	21	2,925	1.4	3,189	1.5
F	12	3,513	0.5	3,683	0.5
I	14	3,780	0.7	3,996	0.7
L	8	43	1.2	44	1.2
NL	4	341	0.2	347	0.2
U.K	7	4,917	0.8	5,051	0.8
EUR-8	10	20,617	0.7	21,614	0.7

Source: E.U Commission, **Research on the "Costs of Non-Europe"; Basic Findings.** Vol. 9 (1988).

Notes: a). These figures are obtained assuming that the elasticity of demand for financial services (e) is 0.75.

b). B Belgium, D = W. Germany, E = Spain, F = France, I = Italy, L = Luxembourg, NL = Netherlands, U.K = United Kingdom.

The Cecchini study also calculates the likely macroeconomic gains that would result from the completion of the internal market in financial services. These gains were expected to reach the order of 1,400 mECUs to 1,600 mECUs.

Many commentators such as Gardener and Teppet (1990) and (1991), Neven (1990), Vives (1991), Llewellyn (1992) agree that the Cecchini Report was a useful attempt at trying to quantify the expected economic gains that would result from the completion of the internal market, but they also put forward serious reservations concerning the methodology and assumptions used in the study.

The estimated microeconomic gains were based solely on the assumption that competition would be strengthened and that prices for financial products and services would be reduced to the lowest levels prevailing in the E.U markets. This assumption is a very strong assumption to make and competition may indeed be lessened as a result of increased merger and takeover activity that is already under way in the financial services sectors in many E.U countries.

Pelkmans (1992) focuses his criticism on two main points. Firstly, the Price Waterhouse study completely ignores the impact of the Single European Market on the rest of the world economy. Secondly, the report seems to underestimate the gains by overlooking the effect of integration on innovation and by neglecting the likely impact of X-inefficiencies.

Moreover, as the Centre for Business Strategy (1989) has noted, other factors such as different legal, regulatory and fiscal systems may hamper complete financial sector integration especially in the retail and lower segments of the corporate banking market and thus raising many questions about the expected increase in competition. The adopted methodology also ignores other important factors such as different national cultures and habits and consumer behaviour, factors which may significantly affect changes in the degree of competition both domestically and internationally.

Llewellyn (1992) also argues that because of economic reasons such as entry costs and scale constraints banking markets may remain partially segmented even in the absence of formal controls and restrictions. In that case liberalisation does not necessarily mean increased competition and therefore the Price Waterhouse findings may be unreasonably overoptimistic.

Gardener and Teppett (1991) have correctly pointed out that the exclusion of the expected losses in producer surpluses from the calculation of the microeconomic gains causes a serious overestimation in this type of economic gain and suggest that they be recalculated after taking producer losses into account. These commentators also criticise the elimination from the analysis of all those financial products whose prices may rise as a result of possible credit rationing and/or extensive cross-subsidising between two or more financial services. The exclusion of these cases and their overall impact on the expected economic gains fails to lend credence to the methodology adopted and provides plenty of "ammunition" to economic observers with opposing views.

Another very important criticicism brought forward by various scholars refers to the great importance and impact that economies of scale will have in reducing costs, increasing efficiency and putting a strong downward pressure on prices. The evidence on the existence of economies of scale in the financial services sector is at best contradictory with some studies suggesting that diseconomies of scale characterise many banking sectors (the subject will be discussed more thoroughly in Chapter 6). The Centre for Business Strategy (1989) raised serious doubts about the assumed importance of economies of scale and they argue that:

" Successful operators in an integrated financial market will be those who correctly exploit the scale and scope economies that do exist without sacrificing the specialisation that can also be very important " (p. 104).

However, despite the above limitations, the major data problems and the limited geographical coverage associated with the Cecchini study, it was a useful first attempt to predict the likely economic gains resulting from the establishment of the Single European Market in financial services. The aim of this thesis is to undertake research in this direction so as to improve our understanding about prevailing competitive conditions in European banking markets and the impact on banking efficiency and performance characteristics.

2.5.5. *The likely consequenses of the Single European Market as seen by the banking industry.*

A recent Arthur Andersen survey of European banking and capital markets discusses the likely consequenses and predictions regarding the effects of the single unified European market as seen by the banking institutions themselves[31]. This study has gathered the opinions of senior officers and executives from 400 banks across 21 European countries.

The survey has found that European banks expect to become more cost-conscious and as a result they anticipate great reductions in the numbers of staff they employ. They also expect to be offering a broader range of products and services (moving towards universal-type banking; universalisation) to both retail and corporate customers albeit at increased fees and subsequently they will make relatively more profits from trading rather than lending activities.

Banks foresee considerable growth in trading for money market instruments, equities, derivatives (swaps, futures and options) and corporate bonds, with more than seventy five per cent of respondents believing that activity in these markets will increase somewhat or significantly. The markets for government bonds, retail and corporate loans and foreign exchange transactions are expected to witness only moderate increases.

A majority of banks accept that the creation of a unified common market for financial services will positively affect profitability, while 15 per cent of bank executives believe that

[31]. Arthur Andersen Consultants, **European banking and capital markets**, (London: Economic Intelligence Unit, Nov. 1993). See also *Financial Times* (Thursday 4 Nov. 1993).

banking profitability will be reduced. However, French senior bank officers are not so optimistic; 45 per cent of respondents expect French banks' profits to be decreased. These conflicting opinions appear to lend some weight to our findings which suggest either positive or negative influences on bank profits.

Additionally, the survey's findings seem to suggest that the German banking system will be structurally affected the most, with ninety one per cent of German respondents expecting closures of numerous bank branches (in a banking system that many commentators describe as "overbanked").

These findings are important and seem to confirm most economists' expectations and predictions about the future development and shape of the European banking market environment. As the Arthur Andersen survey concludes commenting, "For survival, change is not optional-it is mandatory".

2.6 Conclusion.

The structure of European banking markets has changed significantly over the last thirty years or so. We have seen that the present market structure of European banking systems has been shaped (particularly during the 1970s and the 1980s) by developments such as liberalisation, internationalisation, globalisation, deregulation and technological advancement. Banking markets have become more concentrated in many countries with public ownership still playing an important role in some financial sectors (France, Greece, Portugal etc). The 1990's have also been characterised by an increasing intensification in competitive pressures and greater integration of European financial and banking markets.

The first part of this chapter discussed the financial system structures of W. Germany, France and the U.K and we identified several "country specific" characteristics. For example, certain banking systems (French) are more concentrated than others (U.K, W. German), banking business is more segmented and restricted in some markets (France and

W. Germany), banks heavily invest and actively participate in the managing of industrial companies (W. Germany). Moreover, U.K banks appear to be performing better than French and W. German banks, whereas French banks tend to employ less staff than their competitors in the U.K and W. Germany.

The second part of this chapter briefly examined the rationale for investigating the s-c-p relationship in banking markets and also focused briefly on the Cecchini/Price Waterhouse study which attempted to predict the likely economic gains from the completion of the internal market in financial services. The study estimates both microeconomic and macroeconomic effects that will accrue from the lifting of existing barriers to freedom of entry and exchange controls on capital movements. European consumers would be faced with improved and cheaper financial products as a result of greater competition between financial institutions, the exploitation of economies of scale and the elimination of X-inefficiencies.

Despite its limitations, the Cecchini study is a useful indicator for providing predictions about the likely economic effects resulting from financial market integration. It also encourages industrial organisation researchers to investigate whether significant oligopoly profits exist across European banking markets. If this is indeed the case, then E.U integration may imply substantial losses in banking profits and a weakened banking system after the completion of the internal market.

The following chapter provides a detailed discussion of the prevailing (pre-1993) regulatory frameworks in W. Germany, France and the U.K and sets out the E.U Commission's legislative programme aiming towards the Single European Market for financial services.

CHAPTER 3.

THE SINGLE MARKET FOR FINANCIAL SERVICES IN THE E.U.

3.1 Introduction.

This chapter discusses the measures, rules and regulations that have been proposed and adopted with the aim to establish a single market for financial services in the E.U. Section 3.2 presents a brief background to the single market for financial services and Section 3.3 sets out the main barriers to integration of European financial markets. The regulatory banking systems of the U.K, France and W. Germany that were in existence before the Single European Market are analysed in Section 3.4, while Section 3.5 outlines the Single Market programme for banking services; the proposed new rules, regulations and Directives and Recommendations. Section 3.6 is concerned with the problems of creating an integrated European market for financial services and identifies those areas (tax treatments, cross-border payments systems etc.) where different national legislation gives rise to distortions in the free movement of banks and banking services, thus hampering the establishment of a true Single Market. Section 3.7 presents a clear outline of the regulatory framework that will be in place after the completion of the Single European Market programme and points out its main differences from the pre-completion regimes of the U.K, France and W. Germany. Finally, Section 3.8 is the conclusion.

3.2 Background to the Single Market for financial services.

The idea of creating a pan-European common market and "progressively approximating the economic policies of member states" dates back to 1957 when West Germany, France, Italy, Belgium, Luxembourg and Netherlands created the European

Community by signing the historic Treaty of Rome. Subsequently, the Community was enlarged in three occasions in 1973 (Denmark, Ireland, U.K), in 1981 (Greece), in 1986 (Spain, Portugal) and in 1995 (Austria, Sweden and Finland).

The 1957 Treaty of Rome envisaged a single European market, where goods, services capital and people would move freely between member states. The pace with which the Community moves towards the establishment of the single market has been relatively slow. By 1969 all tariff barriers and most trade restrictions were removed.

Over the last thirty years the E.U has adopted legislation with the aim to harmonise banking regulations and foster competition among financial institutions. Baltensperger and Dermine (1990) have identified three regulatory time periods: a) deregulation of entry to domestic markets (1957-73), b) rules promoting the harmonisation of banking regulations (1973-83) and c) the recent Single European Market programme.

The Community reiterated its determination to move forward in 1985, by publishing the famous White Paper on "Completing the Internal Market"[1]. The White Paper reaffirms the Community's eventual aim which is the creation of a true common market, and proposes a detailed programme to achieve this aim. The chosen date for the completion of that programme was 31 December 1992. The Paper sets out more than 300 legislative proposals for the removal of existing trade barriers and regulations and also puts forward a timetable to coordinate the implementation of the programme.

The Community's White Paper led to the signing of the Single European Act in February 1986[2]. The Single European Act focuses on the completion of the internal market by 1992[3]. The Act set 31 December 1992 as the target date for achieving a genuine Common Market. The planned removal of all obstacles to intra-community trade and other

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[1]. *White Paper on the completion of the internal market*, 14 June 1985 COM (85) 310. This work was the creation of a committee chaired by Commissioner Lord Cockfield.

[2]. J.D.Zwaan, "The Single European Act. Completion of a unique document", **Common Market Law Review** (1986) Vol. 23, p.p 747-765.

[3]. *Single European Act*, **Common Market Law Review** (1986) Vol. 23, p.p 813-840, particularly Article 102A.

measures aiming to open up the internal market were expected to result in strengthening competitiveness and accelerating economic growth. The Single European Act also introduced many institutional reforms[4]. The Act proposed that the principle of majority voting may be applied in a large number of cases. Moreover, there were also provisions for extending the management powers of the Commission [for a more detailed analysis see J. D. Zwaan (1986)]. Finally, the Act conferred some new powers on the European Parliament enabling it to assume the role of co-legislator (along with national parliaments) in specific areas[5].

In June 1988 the European heads of state in their Hanover summit decided to set up a special committee of financial experts and central bank governors chaired by Jacques Delors to study ways and means of achieving Economic and Monetary Union (EMU). The proposals put forward by that committee were published in April 1989 in a paper known as the Delors Report.

There are certain conditions which need to be met in order to achieve the economic union on the one hand and the monetary union on the other hand. Economic union means the creation of a market within which goods, services, labour and capital can move freely, competition is strengthened, market forces are reinforced, resource allocation becomes more efficient and divergences between member states' macroeconomic and fiscal policies are eliminated.

On the other hand monetary union requires total and irreversible convertibility of all currencies, complete liberalisation of capital transactions which will lead to integration of banking and other financial markets and last but not least irrevocably fixed exchange rates between national currencies[6].

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4. D. Edward, "The impact of the Single European Act on the institutions", **Common Market Law Review**, (1987), Vol. 24, p.p 19-30.

5. R. Bieber, J. Pantalis and J. Schoo, "Implications of the Single European Act for the European Parliament", **Common Market Law Review** (1986), Vol. 23, p.p 767-792.

6. Complete liberalisation of capital transactions does not automatically and by itself mean integration of European banking markets. It is a necessary but not sufficient condition for the accomplishment of a single market. The Commission's belief is that integration of financial markets will be achieved when EMU is firmly in place.

European and Monetary Union is to be reached in three stages, culminating in a common currency (the Euro) and consequently common monetary and fiscal policies for the Community as a whole, conducted by European central authorities such as the European Monetary Institute (EMI)[7], the European Central Bank (ECB)[8] and approved by the European Parliament and the European Commission. In addition to Economic and Monetary Union, the European Council went further confirming its commitment to political union on 28 April 1990, Furthermore, in June 1991 the European Council set broad guidelines on political union (the Luxembourg presidency had earlier published two draft treaties, one on political and the other on economic union). Political union should include three pillars of national government activity: The first includes all matters already covered by existing and future community policies, the second takes care of various home and judicial affairs (such as jointly combating international crime) and the third envisages a common foreign and security and defence policies.

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7. The European Monetary Institute was set up on 1 January 1994 (as agreed in the Treaty on European Union: Maastricht 7 February 1992). It will be directed and managed by a Council consisting of a President and the Governors of the national central banks, one of which shall be Vice-President. The EMI shall :

" strengthen cooperation between the national central banks

strengthen the coordination of monetary policies of the Member States, with the aim of ensuring price stability

monitor the functioning of the European Monetary System

hold consultations concerning issues falling within the competence of the national central banks and affecting the stability of financial institutions and markets

take over the tasks of the European monetary Cooperation Fund, which shall be dissolved; the modalities of dissolution are laid down in the Statute of the EMI

facilitate the use of the ECU and oversee its development, including the smooth functioning of the ECU clearing system".

The EMI will also be responsible for the preparation of the third stage of European Monetary Union (preparing the instruments and procedures which will be necessary for carrying out a single monetary policy.

8. The European Central Bank along with the national central banks will form the European System of Central Banks (ESCB). The primary objective of the ESCB will be to maintain price stability by defining and implementing the monetary policy of the Community. The ESCB will also conduct foreign exchange operations and it will hold and manage the official foreign reserves of the Member States. The ECB maintains the exclusive right to issue European Community bank notes. The ECB will be governed by an Executive Board and the governors of the national central banks. The Executive Board embodies a President, a Vice-President and four other members, which are appointed "from among the persons of recognised standing and professional experience in monetary or banking matters by common accord of the Governments of the Member States at the level of Heads of State or of Government, on a recommendation from the Council, after it has consulted the European Parliament and the Governing Council of the ECB".

After about six months, in December 1991 all European heads of state reached agreement on these issues in Maastricht (the famous Treaty on European Union), which was signed on 7 February 1992. According to this agreement the U.K is excluded from the social chapter and also from stage three of EMU (the creation of a single currency for all member states) if the British Parliament so chooses.

The first stage was to be completed by 1 January 1994. It included the abolition of all remaining capital controls and the establishment of a European Central Bank. The Council (on the basis of the Commission's reports) will assesss each member's progress towards economic and monetary convergence and also progress towards the implementation of Community laws concerning the single market. In the second stage (1 January 1994 up to 1 January 1997), member states "shall endeavour to avoid excessive government deficits" and "start the process leading to the independence of its central bank". The Treaty on European Union also envisages (during the second stage) the creation of a single European currency (ECU), for at least seven states (excluding the weakest economies of Greece, Portugal and Ireland). These states must fulfil a set of certain, rather strict, criteria (economic indicators such as inflation rates, budget deficits, growth rates etc), in order to insure that a common monetary and fiscal policy will be successful.

If less than seven states qualify at this point (by the end of 1996), they will have until 1 July 1998 to do so and this period (1 January 1997 to 1 July 1998) constitutes stage three of the process towards EMU. This means that EMU will take place irrespective of how many countries fulfil the criteria. All remaining states must enter the single currency group by 1 January 1999.

However, recent developments such as the Danish rejection of the Maastricht treaty in the June 1992 referendum (it was subsequently ratified in another referendum the following year) and the very narrow "Yes" vote in the September 1992 French referendum, have put a huge question mark on the planned evolution of European monetary and political union. The situation was very much worsened by unprecedented turmoil in the foreign exchange markets putting great pressure in the exchange rate mechanism (ERM) of the European Monetary System (EMS). Despite a realignment in the exchange rate mechanism that caused the devaluation of the Italian lira by 7 per cent (September 1992), Italy and the U.K were forced to suspend their ERM membership (consequently pound sterling plunged by about 14 per cent and the Spanish peseta was also devalued by 5 per cent but managed to stay within the ERM).

Almost one year later, the ERM was put into crisis again when most of the remaining national currencies came under strong presure to devalue and the authorities decided to temporarily abolish the two existing narrow bands of fluctuation (2.25 and 6 per cent) for all currencies except the German DM and the Netherlands Guilder and introduce a wide 15 per cent fluctuation band. These developments raised many questions and doubts about the realisation of EMU and whether the convergence of national monetary and fiscal policies (in a world of monetary instability) will take place inside the existing time framework. The achievement of Economic and Monetary Union by the latest date of 1999, appears to have a less than certain outcome.

3.3 Barriers to integration in financial markets.

Llewellyn (1992) has identified five main prerequisite elements that have to be in place for a true single market in financial services to be established. These are: a) banks must be free to locate anywhere throughout the market area in question (either by *de novo* entry or by incorporating subsidiaries), b) banks must be free to supply their products and services anywhere in the market without prior authorization, c) consumers must be free to buy these products and services from anywhere in the market, d) the movement of capital must be free from any sort of exchange controls and limitations and e) a single market for securities must be in place (investors may issue and trade securities freely anywhere in the market).

Price Waterhouse (1988), taking these prerequisite elements into account, have distinguished between three categories of barriers to the integration of financial services: a) physical barriers, b) technical barriers and c) fiscal barriers.

3.3.1 *Physical barriers to integration.*

The physical restrictions are the most obvious type of barriers, namely customs checks and immigration controls in the cross-border movement of both goods and people. Most of the trade restrictions on goods stem from the fact that there are many different national technical standards in the production of goods across the E.U. These restrictions result in higher costs for export orientated companies (arising from higher transport and handling charges), thus reducing competitiveness, increasing prices and distorting trade between member states.

Border controls are also applied in order to protect European citizens from the spreading of unlawful activities to other E.U countries (terrorist exercises, drug smuggling, illegitimate immigrants). The E.U has already simplified and cut down internal customs checks on goods[9]. The next step towards the removal of all physical barriers will be the co-ordination of national government policies on agricultural, health and transport matters along with the adoption of a common immigration policy and the stiffening of external frontiers for non-E.U citizens.

3.3.2 *Technical barriers to integration.*

Technical barriers consist of all those national technical regulations applied in different member countries. It is obvious that these barriers will have to be eliminated along

[9]. That was made possible with the introduction on 1 January 1988 of the "Single Administrative Document" which replaced and even eliminated a lot of formalities in border crossings between member states.

with the physical barriers, otherwise the completion of the internal market will be left "incomplete". In an effort to harmonize all these rules and regulations, the White Paper proposes that all member states should agree on the establishment of some minimum standards and regulations for health and safety reasons. All manufactured products will have to comply with these minimum standards, but producers and manufacturers are entirely free to seek the production of goods that meet higher standards.

Technical barriers also include restrictions and regulations against the free provision of services (information technology, banking and insurance services etc). The Commission's approach is similar to the one it put forward about technical barriers in the trade of goods.

There are also restrictions preventing the free movement of people, due to different educational and training requirements prevailing in various Community countries. As a result the Commission has proposed reciprocal recognition of academic and other professional and training qualifications so that Community citizens can freely work in all member states.

3.3.3 *Fiscal barriers to integration.*

The third category of barriers, the fiscal barriers, refer to the different taxation regimes that are in place across European countries (particularly differences in value added tax -VAT- rates). Under the present system, VAT is collected in the country where the good is finally consumed, which means that exported goods are exempted from the tax which in turn is levied on imported goods. However, the Commission proposes that this system should be set aside (until it is finally set aside the present system still applies). Intra-E.U trade must eventually be treated the same way as domestic trade. Thus, value added tax ought to be imposed on all goods (either destined for domestic consumption or for export). On the other hand, importers will treat all goods as being domestically produced and therefore VAT is already inherent in the total value of the good. Then, at some predetermined regular interval, VAT revenues will be reallocated between the Community countries through some clearing mechanism.

Furthermore, differences in the taxation of investment income continue to exist and to perpetuate distortions in capital movements between member states. The Commission has so far introduced measures that aim to eliminate double taxation and other tax disadvantages on intra-E.U investment income. In 1989, the Commission proposed a common minimum withholding tax of 15 percent, but opposition by some member states has prevented implementation so far.

In addition to this, the Commission has also proposed the harmonization of the various VAT rates that exist throughout the Community to prevent tax-induced cross-border shopping (individuals prefering lower taxed countries from heavier taxed countries). There have been suggested two VAT bands: a low one of 4-9 per cent and a high one of 14-20 per cent[10].

Table 3.1 identifies various fiscal barriers still in existence (in November 1994) across E.U member states.

Table 3.1. Fiscal barriers to the Internal Market Integration across E.U banking markets.

Country	Fiscal barriers
Belgium	- Tax incentives to invest in domestic funds and restrictions on the areas in which such schemes may invest, severely limits the take-up of foreign funds
Denmark	- Consumer credit restrictions, including controls on marketing - Tax allowances available on all interest payments - Taxation on collective investment schemes is considered onerous

10. There has been strong opposition from various member states to the approximation of VAT rates and great controversy concerning the level of the harmonized rates themselves. The U.K government is paricularly anxious to avoid such an outcome arguing that market forces would automatically squeeze various rates to converge. Only very recently (summer 1992) member states have finally agreed on a maximum VAT rate of 18 per cent. Furthermore, it is important to note that a lot of the fiscal proposals in the White Paper have been dropped as a result of insurmountable difficulties in agreeing to common taxation policies.

France	- All financial institutions pay a special tax of 1% on overheads linked to domestic business - Limitations on the amount of interest deducted for borrowings from foreign parent companies are not applicable to subsidiaries of French companies - A range of specialised credit institutions attract certain special advantages - There is still a stock exchange transactions tax - Staff costs incurred by banks are taxed according to the proportion of their business which is not liable to VAT - Two tax-exempt savings schemes are available only from the French Post Office and the CMCE - The tax advantages given to French mutual funds distort the whole European savings market - At least one new tax-exempt share savings plan is restricted to a minimum of five years investment exclusively in French shares (in French Stock Exchange)
Germany	- None reported
Greece	- Interest from government T-Bills is tax free, but interest from bank deposits is taxed at 15%
Ireland	- Certain deposits attract preferential tax treatment - The International Financial Services Centre pays a 10% environment tax - Tax-based financing still exists, though its use is restricted - There is preferential tax treatment of certain financial institutions (building societies versus banks), although it is very small
Italy	- Reimbursement to foreign investors of excess withholding tax on government bond interest is subject to delay - Reimbursement of income tax credits is also subject to delay and penalises foreign banks more than local banks - Non-residents are practically excluded from lending to Italian non-bank residents because a 15% withholding tax is payable on interest remitted abroad
Luxembourg	- None reported
Portugal	- Withholding tax is payable on loans by non-residents - Charges imposed on over-the-counter transactions still exist
Spain	- There are delays of 5-6 months in repaying excess withholding tax
Netherlands	- None reported

Source: E. U Committee, British Invisibles (November 1994).

3.4 European regulatory banking systems before the Single European Market.

3.4.1 *The British regulatory framework.*

3.4.1.1 Introduction.

The pre-1993 system of rules and regulations[11] governing the British banking sector is provided by the Financial Services Act of 1986, the Building Societies Act of 1986 and the Banking Act of 1987. The Banking Act formalised the role of the Bank of England as regulator of the banking system and authorised the foundation of the Board of Banking Supervision to control all areas of banking supervision. The Building Societies Act suggested the establishment of a Building Societies Commission to oversee and supervise the Building Societies' activities. Moreover, these laws formalised the previous system of rules and regulations and modified its self-regulatory nature (banks are no longer self-regulatory institutions; the Bank of England has formally taken over this role; the Bank always did exercise this role but its control and supervision was informal).

3.4.1.2 Main bank regulations.

The regulatory structure of the British banking system evolved under the principle that supervision and prudential regulation should be accommodating rather than restricting different areas of banking business.

Prior to the Banking Acts of 1987 and 1979, which formalised the role of the Bank of England ("The Bank") as the sole supervisor and regulator of the banking system, there

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[11]. The information presented in this chapter regarding the pre-1993 regulatory structures in France, W. Germany and the U.K is drawn from the following documents:
- **Bank of England Annual Report under the Banking Act of 1987**, (Bank of England 1988/89)
- **Commission Bancaire Annual Report** (Commission Bancaire, 1989)
- **Deutsche Bundesbank, The Banking Act of July 1985**, (Deutsche Bundesbank Publications, 1987)
- **89/646/EEC, Second Council Directive of 15 December 1989**, (OJ No. L 33, 30-12-89).
- **International Financial Law Review: The Regulations Governing Banking Across the E.C** (Euromoney Publications, 1989: France p. 16, U.K p. 48 and W. Germany p. 59).

existed an informal system based on self-regulation by the banks themselves[12]. There were regular contacts between officials of "The Bank" and bank management relating to regulatory questions and consultation and advice was often given in more serious circustances. There was no formal system of regulations and rules that had to be followed or any codes of practice. It was believed that it would be in the banks' best interests to ensure "keeping their house in order".

Furthermore, there was no clear definition on what exactly constituted a bank. Any company or individual could accept deposits and there was no need to seek a license from the appropriate authorities.

The implementation of the 1979 Banking Act, was made necessary following the EEC First Banking Coordination Directive of 1977 (a more detailed discussion of this and the Second Banking Directive follows in the second part of this chapter). The 1979 Banking Act classified all deposit-taking institutions as either "recognised banks" or "licensed institutions" with the former having to meet more strict criteria (i.e: having already established themselves with a high reputation in the financial community and been providing "either a wide range of banking services or a highly specialised banking service"). This Act also introduced a Deposit Protection Fund which guaranteed the protection of 75 per cent of all sterling deposits up to a maximum of £10,000 (excluding interest). This maximum was subsequently raised to £20,000 with the introduction of the 1987 Banking Act.

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[12]. For a more detailed discussion about the history of regulation of the British financial system, see C. Mayer, "The Regulation of Financial Services: Lessons from the U.K for 1992" in J. Dermine ed. *European Banking in the 1990's* (Basil Blackwell: Oxford 1990).

3.4.1.3 The 1987 Banking Act.

3.4.1.3.1 Scope of activities.

The 1987 Banking Act introduced a deregulation framework that provided the legal basis for the rapid expansion of banks into non-banking activities such as insurance and brokerage services, estate management, asset management etc. Furthermore, although banks can undertake any investment they may wish (there are certain limits to investments in manufacturing), they are usually subject to review (especially when they are substantial relative to the bank's size). More specifically,

Retail banks can engage in securities activities (most of which are usually offered through subsidiaries and **merchant banks** can offer deposits and savings accounts and other commercial banking activities. Banks are allowed to engage in real estate and act as real-estate brokers.

3.4.1.3.2 Large exposure.

Large loans to single customers should be approved by the appropriate supervisory authority when a). the loan reaches 10 percent of the bank's equity capital and b). when the loan is equivalent to 25 percent or more of the bank's capital. Approval for loans exceeding 25 percent of a bank's capital will be granted only in exceptional circumstances[13]. This regulation does not only apply to British banks but to branches of foreign banks as well.

3.4.1.3.3 Liquidity ratios.

The Banking law does not impose a specific standard ratio of liquidity which all banking institutions are obliged to observe, but instead the Supervisory Authority takes into account each bank's particular characteristics and its role in the financial system. Instead of a

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[13]. It is important to note that all estimations for the calculation of exposure ratios are carried out on a consolidated basis.

sole ratio of liquidity, British banks must apply a combination of liquidity measures such as liquid assets ratios, future cash flows and an adequate deposits basis. The measurement of liquidity is carried out using cash flows. The net difference (mismatch) between each bank's assets and liabilities is the most common measure of a bank's liquidity position. The Bank of England uses two different definitions of liquid assets in calculating liquidity ratios; Tier 1 and Tier 2 liquid assets. Tier 1 liquid assets are risky assets with no limits attached to them while Tier 2 liquid assets are risky within a limit and are used up to a certain extent (the conversion factor being 20 percent).

3.4.1.3.4 Capital adequacy.

The British banks have to comply with the capital adequacy rules and regulations that were put forward by the Bank for International Settlements (BIS) in December 1987[14]. The minimum proposed capital adequacy ratio (total capital base total assets) is 8 percent, of which at least 4 percent must be made up by the core capital element. According to the BIS capital adequacy framework, a bank's core capital must take up at least 50 percent of the bank's total capital base[15]. The proposals also include five risk weights (0, 10, 20, 50 and 100 percent) which are used in the calculation of risk assets ratios. The higher weights are generally applied to those balance sheet items that are not accompanied by any guarantees or collaterals whereas the lower weights are usually applied to land premises and residential mortgages. Furthermore, all off-balance-sheet activities are assigned specific risk weights for the first time.

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[14]. These proposals were included in a paper prepared by the Committee on Banking Regulations and Supervisory Practices (known as the Cooke Committee, the name of its chairman). The paper was entitled "Proposals for international convergence of capital measurement and capital standards". The Bank of England implemented the BIS proposals with the so called "explanatory paper". These capital adequacy proposals are to be fully implemented by the end of 1992. The European Commission's Directives on the Own Funds and Solvency Ratios propose very similar measures in conjunction with the BIS proposals (see our conclusions at the end of this chapter).

[15]. The rest of the bank's capital (supplementary capital) includes undisclosed reserves, revaluation reserves, general loan loss reserves (up to 1.25 percent of risk assets), hybrid debt capital instruments and subordinated term debt.

3.4.1.3.5 Foreign exchange exposure.

Foreign exchange exposure is monitored and supervised by the Bank of England which has set out (in April 1981) the following framework: each bank's foreign exchange operations are separated into short-term foreign exchange dealings (arising from normal day to day banking activities) and long-term foreign exchange positions (arising from activities such as loan capital and investments in subsidiaries). The net open short-term foreign exchange position in all currencies cannot exceed 15 percent of the adjusted capital base and the net open dealing position in any one currency cannot exceed 10 percent of the adjusted capital base (as defined by the Bank of England in "The Measurement of Capital). All these dealing positions are reported by all banks to the Bank of England on a monthly basis[16]. As of April 1984, it is the Bank's policy to include foreign currency options in the measurement of foreign currency exposure, but not currency swaps[17].

3.4.1.3.6 Provisions for loan losses (Country debt provisions).

There are no specific regulations applying in this particular area. The concern of the regulatory authorities is to make sure that all banking institutions have adequate capital for the risks they undertake. However, the Banking Act has not produced any guidelines and the question of bad debt exposure is dealt with by the banks themselves. In 1987, the largest British banks substantially increased their provisions for bad country debts and this resulted in a significant decline in the banks' profits (see the chapter on the performance and structure of the British financial system). This change in the banks' attitude towards country debt exposure was brought about by a Bank of England advisory note that circulated in August 1987. This note included the famous **Bank's matrix** that provided a detailed scoring system for numerous countries world-wide in order to assess an individual country's ability and

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16. These reports include the net spot and net forward, long or short positions in each currency at the end of the working day on which the report is due.
17. See *Bank of England Quarterly Bulletin* (Feb. 1988).

likelihood to repay a loan[18]. Each of these scores corresponds to a particular provisions range. The Bank of England updates this matrix periodically, taking into account new developments and new data.

3.4.1.3.7 Other important regulations.

A. The Bank of England has ultimate control over the ownership of British banks, because it has the authority to block any take-overs of British banks by foreigners or by any other buyer in order to protect the depositors' interests. A foreign or domestic institution planning to acquire more than 15 per cent of the share capital of a British bank, has to receive the approval of the Bank of England. All bank mergers are subject to Bank of England approval, which may not be given in cases where competition is likely to be lessened if a merger is allowed to take place. Banks are permitted to open new branches after notifying the Bank of England.

B. The Bank of England monitors and supervises the activities of all U.K branches of foreign banks, but the main responsibilities are borne by the home authorities and the bank's management team.

C. There are no restrictions whatsoever on capital inflows[19] and capital outflows (all such restrictions were abolished in 1979).

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[18]. This scoring system is based in a range of different factors such as the borrower's past servicing history (number of reschedulings), factors accounting for a borrower's current debt service problems (arrears, repayment of other loans etc) and factors covering present and future economic prospects.

[19]. Although, there are no restrictions on direct investments some mergers or take-overs may be subject to approval by the Monopolies and Mergers Commission.

3.4.2 The French regulatory framework.

3.4.2.1 Historical background.

The French banking system has been significantly changed over the last fifty years (for an in depth discussion of the French banking system see C. de Boissieu (19992)). The first major piece of legislation affecting the banking system was the Banking Act of 1945. This Act provided for the nationalisation of the four largest banks (Credit Agricole, Credit Lyonnais, Banque National de Paris and Societe Generale) and put all existing institutions into three categories, namely, deposit banks, investment banks and long and medium-term credit banks (these banks could not interfere with each other's business)[20]. The deposit banks were not permitted to take deposits of maturity greater than two years, thus effectively reducing their involvement in medium and long-term lending. Deposit banks were not allowed involvement in investment banking and conversely investment banks were not allowed involvement in domestic banking operations. Investment and medium and long-term credit banks were only allowed to take deposits of maturity greater than two years and furthermore, investment banks were not permitted to open branches. The 1945 Banking Act also proposed the establishment of the Conseil National du Credit (CNC) which had the task of overseeing and supervising the banking system.

The banking system operated under these segregating restrictions until 1966-67, when the government introduced a series of reforms relaxing the distinctions and the strict boundaries within which all categories of banks had to operate. Deposit banks were permitted to take long-term deposits and credit banks were permitted to get involved in the deposits banks' line of business. Deposit banks were also allowed to interfere in investment banking activities and as a result investment banks were greatly affected, since many of them were absorbed from deposit banks or converted into deposit banks. There also followed

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[20]. See Peat Marwick, Mitchell and Co. *Banking in France* (Paris 1982).

many mergers between investment banks, since increased competition put a great deal of pressure particularly upon the smaller investment banks (see P. Marwick et. al. 1982).

The Nationalisation Act of 1982 had a big impact on the ownership structure of the French banking system. All registered banks with deposits of more than 1 billion FF were nationalised except a) banks which had the status of real estate companies or discount houses and b) banks with a majority of non-resident shareholders. The number of all nationalised banks reached 39[21].

The 1984 Banking Act is the single piece of legislation that provides the present regulatory structure of the French banking system. All types of financial institutions are grouped into a single category called "credit establishment". The Banque of France is responsible for the monitoring and supervision of the banking system and there are four more national institutions involved in bank regulation, as we have already seen (in the chapter describing the performance and structure of the French banking system). These national bodies include:

a). The Committee on Bank Regulation (responsible for prudential regulations and accounting standards)

b). The Banking Commission (responsible for the soundness of the system)

c). The Credit Establishment Committee (responsible for the licensing of banks)

and d). The National Credit Council (in an advisory role for the Ministry of Finance).

3.4.2.2 Main bank regulations.

The two previous decades witnessed a gradual process of deregulation and reregulation that significantly affected and changed the French financial market scene and made it very similar to that in the U.S.A as Swary and Topf (1992) point out[22]. One of the

[21]. This vast nationalisation programme was reversed in 1986 when the conservatives came back to power and most banks were sold back to the private sector (see I. Swary and B. Topf, *Global Financial Deregulation* (Cambridge Mass: Blackwell 1992)).

[22]. The two banking systems are similar to the extent that there remain a great number of small provincial banks which conduct business only on a local basis (see Swary and Topf, page 111).

most recent examples of deregulation was the collapse of a very important regulatory barrier in 1990, when all capital controls were abolished.

3.4.2.2.1 Scope of business.

There are various restrictions and limitations to the range of activities a credit establishment may engage in. As a result most banks only operate in areas that are closely related to their main functions. For instance, until very recently (1988), brokerage services were exclusively offered by specialised brokerage firms and no other type of credit institution. However, in January 1988 French banks were allowed to participate in the raising of equity capital which became obligatory for the brokerage firms[23], and thus gained access to this line of business through acquiring brokerage firms.

Investment in other activities not associated with banking are restricted and cannot exceed an upper ceiling (5 percent of the bank's own funds and/or 50 percent of the capital employed)[24]. Furthermore, the net income gained from non-banking activities such as insurance and investment in businesses may not exceed 10 percent of the global net income of a credit establishment (banks are generally allowed unlimited participation in such activities through their subsidiaries). The Ministry of Finance has the authority to approve or disapprove any investment that is worth more than 10 percent of a bank's capital.

There are also various lending limitations designed to protect the banks from overexposure to a single client. Therefore, banks may not sustain net risks of any single borrower which exceed 50 percent of the bank's employed capital[25] (all risks exceeding 25 percent of a bank's capital are necessarily reported). Furthermore, any single guarantee given cannot exceed 40 percent of shareholder equity (since December 1988).

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23. This increase in the banks' equity participation was spread over a three year period: 30 percent in 1988, 40 percent in 1989 and 100 percent in 1990.

24. The Second Banking Directive suggests that these percentages should increase to 15 percent of own funds and 60 percent of capital employed.

25. Net risks are simply the net amount of loans and guarantees granted minus the guarantees received by the borrower.

There are no restrictions on the establishment of foreign banks in the domestic market, however, foreign banks wishing to acquire more than 20 per cent of the equity share of a French bank have to apply for authorization from the French Ministry of the Economy and the Bank of France[26].

3.4.2.2.2 Liquidity.

The liquidity of a particular banking organisation is represented by the liquidity ratio (short-term assets divided by short-term liabilities), which must always be equal or greater than 100 percent. Banks report liquidity ratios every quarter, and they also report future predicted liquidity ratios (observation ratios).

3.4.2.2.3 Capital adequacy.

In order to enhance and protect the soundness of the French banking system, the regulatory authorities have proposed that the ratio of adjusted own funds to fixed assets and fixed investments must be at least 60 percent (from 1992 onwards). The European Commission's proposal that solvency ratios must not be lower than 8 percent became operative on January 1, 1993. In addition to these ratios, French banks were obliged to report risk-assets ratios, by dividing the amount of capital employed by various risk items (each of which is assigned a specific risk weighed percentage: minimum 5 percent and maximum 100 percent).

3.4.2.2.4 Foreign exchange risk.

All banking institutions that are involved in the foreign currency markets must comply with the following restrictions. Firstly, the ratio of a bank's net position in each foreign currency to its net own funds cannot exceed 15 percent and secondly, the ratio of a

[26]. Foreign bank presence in France has increased substantially in the last 25 years (51 banks in 1969 compared to 145 banks in 1987).

bank's aggregate net position in all currencies to its own funds cannot be greater than 40 percent.

3.4.2.2.5 Provisions for loan losses.

There is no minimum level of provisions for bad debts or loan losses, but there are specific rules for the classification of all qualities of loans. In contrast to the British practice (the Bank of England's matrix), there are no particular varying risks attached to the extension of credit to third countries.

3.4.2.2.6 Deposit Protection Scheme.

A Deposit Protection Fund was established in 1980 guaranteeing all French Franc deposits (100 per cent) up to a maximum of 400,000 F.Fr per depositor (plus all accumulated interest). Participation in this deposit protection scheme was compulsory for all banks, which payed an annual contribution (for their membership of the fund) according to their size (for small banks, a maximum 1 per cent of deposits). In the event of a big loss, the Fund would depend on contributions from its members to indemnify all depositors.

3.4.3 The W. German regulatory framework.

3.4.3.1 Historical background.

The regulatory framework in Germany is based on the Banking Act of July 1985[27]. The two federal institutions of paramount importance for the monitoring and supervision of the banking system are the Federal Banking Supervisory Office (FBSO) and the Deutsche Bundesbank (for a more detailed discussion of the W. German banking system and its sources of finance see Scheidl (1988)).

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[27]. **Deutsche Bundesbank**, The Banking Act of July 1985 (Deutsche Bundesbank Publications: 1987).

The FBSO is responsible for the issuance or withdrawal of banking licenses, the issuance of prudential regulations (capital adequacy, liquidity etc), the setting of auditing and management standards, the approval of the selection of bank management and the general monitoring and supervision of a bank's affairs. It is important to note that the FBSO must obtain the approval of the Deutsche Bundesbank for all its policies and practices.

The Bundesbank on the other hand, has the responsibility of planning and conducting monetary policy (including the setting of interest rates such as the Lombard and Discount rates) and the determination of minimum reserve requirements[28]. The Bundesbank also acts as banker to the federal government and to the rest of the banking system. In addition to these functions, the Bundesbank receives all bank reports and accounts (monthly and annual) and then transfers them to the FBSO along with its notes and observations.

3.4.3.2 Main bank regulations.

3.4.3.2.1 Scope of business.

There are no restrictions and regulations whatsoever limiting the permissible activities of a bank. All banks can be involved in any non-banking activities as long as they report the beginning and termination of these activities to the Bundesbank. Furthermore, German banks are allowed to own shares of industrial and other commercial enterprises and they are required to report to the FBSO any change in their participations (especially if these participations exceed 5 percent of capital).

3.4.3.2.2 Lending limitations.

The German banking system complies with the following lending limitations and restrictions:

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[28]. These tasks make the Bundesbank by far the most independent central bank in the developed world.

a). All large loans to a single borrower (those exceeding 15 percent of equity capital) should be reported to the Bundesbank[29]

b). Large loans must be approved by all bank managers

c). Loans that are greater than 50 percent of bank capital are not permissible

d). A bank's total volume of large loans is not allowed to exceed eight times the bank's equity capital

e). There are specific restrictions and guidelines applying to lending to officers and bank managers, members of the supervisory board and other entities connected to the bank in question.

3.4.3.2.3 Liquidity requirements.

The regulatory framework in this area mainly consists of three Principles. Principle I states that all banks must maintain sufficient liquidity at all times. Principle II suggests that the volume of a bank's long-term assets should not be greater than its long-term funds (thus keeping an equilibrium between long-term assets and long-term liabilities)[30]. Principle III requires that the volume of a bank's medium-term assets is at least equal to the total volume of the bank's sources of funds. Medium-term assets include listed stocks and investment fund shares, promissory notes and 20 percent of a bank's loans with maturities between three months and four years, whereas a bank's sources of funds are 20 percent of savings deposits 80 percent of the total volume of loans owed to other banks.

Furthermore, all banks are required to hold interest free deposits with the Federal authorities (the amount of these deposits varies with the size of the bank).

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[29]. Loans that are less than DM 100,000 are exempted unless they amount to more than 50 percent of equity capital. Furthermore, all increases of more than 20 percent to the value of an outstanding loan must be reported as well.

[30]. Long-term assets are items such as unlisted securities, long-term loans (with maturities of at least four years), real estate, equity capital, bonds maturing in at least four years, 60 percent of savings deposits etc.

3.4.3.2.4 Capital adequacy.

The German Banking Act requires that the total amount of all loans and equity participations of a bank minus provisions for loan losses, must not be greater than 18 times the bank's equity capital[31]. The Law also limits the amount of total capital a bank is allowed to put aside for permanent investments, to be at most equal to the total amount of the bank's equity capital (see Bernd (1990) for a discussion of German banks' capital requirements in conjunction with E.U proposals on banking supervision). Permanent investments are thought to be items such as buildings and land, furniture, participations in banks and other enterprises exceeding 10 percent of the equity capital of the enterprise and various other long-term investments.

In June 1986 and then in October 1990, the Federal Banking Supervisory Office proposed new rules to force banks to be adequately covered against their ever increasing off-balance-sheet transactions and risks. In all such transactions banks must limit the exposure of their liable capital according to the risks attached to a particular transaction. The German law adopts the EC Solvency Ratio Directive proposals in calculating the appropriate amount of liable capital (credit equivalent amounts). Hence, banks either use the so called original exposure method or the marking-to-market method.

3.4.3.2.5 Deposit protection schemes.

There are several deposit guarantee funds in the German banking system. The funds established by the commercial banks (and set up by the banking associations) have as their main purpose the protection of depositors, whereas the funds established by the savings banks and the credit co-operative banks are mainly designed to prevent bank failures. Hence, the deposit protection funds for commercial banks guarantee all deposits of a member bank up to 30 percent of the equity capital of the bank (see **Deutsche Bundesbank**, The Banking

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31. This calculation includes only those equity participations where the bank owns at least a 40 percent share of another company.

Act of July 1985). If a bank's total deposits do not exceed 30 per cent of its equity capital, then all its depositors are guaranteed 100 per cent protection. The annual premium for fund coverage is 0.03 percent of a bank's total liabilities (except those liabilities to other banks). Besides this annual premium (which often changes according to fund needs), there is also a small entrance fee into the fund.

3.4.3.2.6 Foreign exchange exposure.

A bank's net position (assets minus liabilities) in all foreign currencies and precious metals cannot exceed 30 percent of the bank's equity capital and reserves (at the close of each business day). Additionally, at the close of any business day, the maturing foreign net position in any one calendar month must not exceed 40 percent of the bank's equity capital. In October 1990, new proposals were put forward in order to limit a bank's exposure to risks arising from off-balance-sheet financial instruments (such as spot and forward currency contracts, options and swaps).

3.5 The Single European Market for financial services.

3.5.1 Introduction.

The regulatory framework of the single internal banking market is described in the Second Banking Co-ordination Directive and in the two Directives on Solvency Ratios and bank Own Funds. Additionally, there are also many proposals and recommendations and amended proposals and recommendations that complete the picture.

The Second Banking Coordination Directive was preceded by two less important Directives, namely the Freedom of Establishment Directive (73/183/EEC) and the First Banking Coordination Directive (77 80/EEC).

The Freedom of Establishment Directive (Directive on Abolition of Restrictions on Freedom of Establishment and Freedom to Provide Services in Respect of Self-employed Activities of Banks and other Financial Institutions) ensured equal treatment of domestic banks and subsidiaries of foreign banks by national supervisory authorities. Recent studies by Clarotti (1984) and Molyneux et. al. (1994) have shown that from 1973 onwards banks were free to set up business anywhere in the E.U, although capital restrictions remained in place.

The First Banking Coordination Directive very clearly set out the minimum legal requirements banks had to meet in order to be authorised in other member states. If the bank met these requirements, it could freely set up branches in another member state according to the host country's rules and regulations (concerning the setting up of branches). Dixon (1991) argued that the First Banking Coordination Directive did not create a Single Market, but it was a first important step towards that direction. Furthermore, Vesala (1993) suggested that banks wishing to set up branches in another member state incur considerable costs and delays in order to comply with host-country requirements and these constitute important legal barriers to the free provision of banking services.

The Second Banking Co-ordination Directive was issued by the European Commission in January 1988 and was adopted in December 1989. Its implementation by the member states is spread over a three year period and must be completed on January 1, 1993 (it has already been implemented in all E.U member countries' banking legislation). This Directive applies to all E.U banking institutions except those which were excluded in the First Banking Co-ordination Directive of 1977. The banking institutions for which neither of the two Directives is applicable are national central banks, Post Office giro banks and certain other financial institutions in member states such as municipal banks, credit unions etc.

The Second Banking Coordination Directive retains the definition originally provided by the First Banking Co-ordination Directive of what type of institution is considered to be a bank. According to this definition, a bank is "an undertaking whose business is to receive deposits of repayable funds from the public and to grant credits for its own account". The Second Banking Coordination Directive allows banks to expand their operations and offer a wide range of products and services in addition to their traditional line of business (deposit-taking and lending). Banks may offer money transmission services, financial leasing services, issuance of credit cards, travellers cheques and bankers drafts, guarantees and commitments, money broking and portfolio management and advice services, credit reference services and safekeeping of securities. Furthermore, banks are allowed to participate in share issues and to trade (for own account or for customer's account) in foreign exchange, securities, financial futures and options, money market instruments (bills, CDs, cheques etc) and exchange and interest rate instruments (all included in the Second Banking Co-ordination Directive)[32].

Llewellyn (1992) argued that this list of activities was brought forward due to the gradual abolishment of traditional demarcation lines between commercial and investment banking. The inclusion to the list of all forms of securities transactions may have a substantial impact on member states such as Italy, Spain, Greece and Portugal where commercial banking and securities business were traditionally strictly separated.

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[32]. Banks are also allowed to provide services in other member countries that are not included in the list, if the host countries give them permission to do so.

The most important changes introduced with the Second Banking Coordination Directive are discussed in the following section.

3.5.2 The Second Banking Coordination Directive.

3.5.2.1 Freedom of establishment.

The Freedom of establishment principle allows any licensed credit institution operating in one member state to open up branches[33] (de novo entry) and/or supply cross-border services in any other member state of the European Community, without having to obtain authorisation from the appropriate authorities of the host country[34]. A Community bank may offer a wide range of services (a detailed list has been presented earlier) in another Community country, as long as it holds a valid license to offer these services at home[35].

Furthermore, a credit institution will be allowed to offer services that are not even included in the Second Banking Co-ordination Directive, provided that the appropriate regulatory authorities (home or host country) grant valid licenses. Therefore, the Directive suggests that the list of permissible banking activities has to be regularly updated as new products and services become commercialised.

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[33]. It is useful to distinguish between branches and subsidiaries to avoid possible misunderstanding and misinterpretation. Bank subsidiaries are companies that are legally controlled by banks, which means that banks hold a stake of 50 to 100 per cent of these companies' shares. Banks might control companies even if they have a less than 50 per cent shareholding, but these companies are not considered as bank subsidiaries. On the other hand, bank branches are just points of operation (shops) of a particular bank: in other words all branches of a particular bank are parts of only one company.

[34]. However, the host country authorities may delay the establishment of a foreign bank's (EC) branch by up to three months. This period has to be added on another possible three month delay before the home authorities approve the proposal and inform the host authorities.

[35]. A bank is allowed to offer these services even if the host authorities prohibit all domestic credit institutions to do so. In this case, the host country's domestic banks will clearly operate at a disadvantage compared with the "foreign banks". Therefore, the regulatory authorities of the more restricted banking environments will be, sooner or later, forced to liberalise and deregulate in line with the rest of the Community countries, in order to help their domestic banks to compete with the rest of the Community banks. Foreign banks' branches are required to give one month notices to the home authorities before they are allowed to offer a new service or other cross-border services.

The freedom of establishment rule applies not only to the authorised credit institutions but to their subsidiaries as well, even if they are not financial institutions. However, these subsidiaries have to meet the following conditions: a) their operations and activities have to be completely consolidated with those of the parent bank and b) the parent bank owns at least 90 percent of the subsidiary's shares and it accepts full responsibility for the subsidiaries accounts and operations. As Swary and Topf (1992) argue, the adoption of this practice became apparent because some member states (Germany and until very recently France) do not allow their domestic banks to offer all of the recognised services (in the Second Banking Co-ordination Directive) directly, but only through subsidiaries.

The Second Banking Co-ordination Directive also requires the removal of all barriers and obstacles to the provision of cross-border banking services. Cross-border banking services may be provided in three different ways: a) the provider of the service visits the recipient in his country, b) the recipient visits the provider in his country and c) the service is offered through communication (telex, fax, telephone etc). When, the provider of the service crosses the border the situation becomes somewhat complicated.

The Directive (Articles 59 and 60(3)) explicitly requires equal treatment of domestic and foreign providers of services. However, the European Court[36] has ruled that some laws and provisions apply only to the domestic companies and not to foreign companies which **temporarily offer** various services in a member state. Hence, it is possible that identical services will be provided by both domestic and foreign institutions, although the foreign provider will be at an advantageous position (not having to observe certain provisions). It is essential to point out, that this case may only arise when the foreign provider offers his services only on a temporary basis and has not set up branches in the other member state.

For example, banks in Belgium are not allowed to offer travel agency services, but banks in the Netherlands are heavily involved in providing travel services. If a bank in Netherlands decides to establish a branch in Belgium, it would not be allowed to offer travel

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[36]. Case 205/84, *Commission v. Germany* (1986), ECR 3802 (1987) 2, **Common Market Law Review** Vol.69.

services, although it is allowed to offer them on a cross border basis from the Netherlands (and in fact any other banking service that it is allowed to offer at home). In this case, an established Netherlands bank in Belgium (and all other Belgian banks) is prohibited from offering a particular banking service, which is offered from other Netherlands banks from across the border. This example is applicable to other banking services as well, putting domestic institutions at a disadvantage in relation to foreign providers.

Furthermore, a few problems still remain when the actual provision of the service itself takes place. A cross-border service may be provided freely, as long as the provider fully complies with the rules and regulations of his home country and as long as the host country does not require the application of any special safeguards and conditions in allowing the provision of the service. These special provisions and safeguards might include the protection of worker's rights, consumer protection issues and the protection of the environment[37]. The host state is even permitted to apply its rules and guidelines to foreign companies as well, as long as these companies are situated very close across its border and mainly do business in the host state's territory (this might happen when a foreign company wishes to avoid the host state's strict regulatory framework).

Therefore, it has become evident that the Second Banking Co-ordination Directive and the European Court of Justice provide the regulatory framework to ensure the freedom of establishment for credit institutions and the free provision of cross-border services, but there are some cases when exceptions to these principles are clearly justified in order to protect the consumers and more generally the public interest.

However, Norman (1989) expresses considerable doubts concerning the effectiveness of the freedom of establishment principle in eliminating all barriers in the setting up of financial institutions and in the trade of financial services. Norman examined the regulatory structures of the twelve member states that were in existence in 1989 and tried

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[37]. These regulations and restrictions may arise in special occasions clearly defined by the European Court. For further details see: Cases 110 and 111/78, *Van Wesemael* (1979), ECR 35 (1979) 3 and Case 249/80, *Webb* (1981), ECR 3305, **Common Market Law Review**, Vol. 87.

to determine which banking systems would provide the most appealing regulatory environment to take advantage of the single banking licence principle. Despite the abolition of all controls and barriers and the establishment of the Single European Market, many national differences, political risks and perceived credit differentials will remain and they will constitute important regulatory differences. The author calculated regulatory rankings for all member states according to the volume of banking regulations and capital controls that prevailed in each market and concluded that well established banking systems such as W. Germany, Luxembourg, the Netherlands and the U.K appear to offer the most hospitable regulatory environments to take advantage of the freedom of establishment principle. By contrast, Italy, Greece, Spain and Portugal appeared to be the most heavily regulated banking systems in the E.U and Norman suggested that they would be the least attractive banking systems in the Single European Market.

3.5.2.2 Endowment capital.

New endowment capital rules allow bank branches of foreign institutions (bank subsidiaries of foreign banks are not included in this provision) to no longer maintain minimum levels of endowment capital (capital that is put aside before a bank is established- all the existing minimum levels of endowment capital are to be phased out by 1992). This provision greatly reduces the costs associated with setting up a branch, thus making it easier for foreign institutions to expand throughout the Community (although expansion through de novo entry still remains the most costly option).

3.5.2.3 Minimum harmonisation.

A minimum harmonisation of the various supervisory standards and guidelines that exist throughout the E.U is essential in order to prevent the concentration of companies and businesses in those countries which retain the lowest standards of supervision. The Directive provides for the harmonisation of minimum capital standards, and standards associated with bank participation in non-bank activities and the control of major bank shareholders.

Under the Directive's proposals, a credit institution needs to have at least 5 million ECU initial capital level in order to be established. Those banks who obtained licenses before the Second Banking Directive came into force were given a grace period until the end of 1996 to comply with this rule. Furthermore, under no circumstances, are a bank's capital funds allowed to fall below this level. Individual member states may apply a higher minimum capital standard to their domestic banks.

All banks have to report to the supervisory authorities annually the shares, identities and business activities of their major shareholders, and the same is required for any investor (individual or corporation) who wishes to acquire partly or fully a credit institution's shares. If the supervisory authorities have substantial doubts about the proposed ownership changes (which may result in cross-financing between the bank and its owners and other conflicts of interest), they have the power to block the proposed sale. Additionallly, the supervisory authorities are also informed of the identities and size of shareholdings of a bank's major shareholders, when the bank applies for authorisation. The authorities will only grant a license after thoroughly examining the background of the proposed institution's largest shareholders.

Furthermore, all E.U credit institutions are subject to strict limits when acquiring equity stakes in non-banks. A bank's participation in any one non-banking business cannot exceed 10 percent of the bank's own funds and the total value of all the bank's participations cannot exceed 50 percent of its own funds (a definition of a bank's own funds is provided in the Own Funds Directive, see next section). These limits are applied in order to ensure the soundness and financial stability of the banking system and to protect a bank from overexposure in the non-financial sector.

3.5.2.4 Home and host country control.

Home and host country control is strongly based on the principle of close co-operation between the supervisory authorities of member states. The home country supervisory authorities retain the responsibilities to monitor the activities of all banks (including branches of foreign banks) operating in its territory and apply all prudential and other rules and regulations introduced by the Second Banking Directive. The home country authorities also have the right to monitor the activities of their domestic banks' foreign branches, after informing the host authorities first. On the other hand, the host country supervisory authorities have as their main objective the supervision of liquidity, the monitoring of solvency guidelines in relation to a bank's securities activities[38] and the implementation of monetary policy.

The Directive also contains specific provisions about the harmonisation of professional secrecy rules that apply to the exchange of information between home and host country authorities and to past and present employees of the banking authorities.

The principle of co-operation between the home and host country authorities is exercised even before domestic banks establish foreign branches. The home country authorities evaluate the appropriateness of the bank's proposals and grant permission for the establishment of a foreign branch, or object to the bank's plans, and then notify the host country authorities. In relation to the provision of a cross-border service, a simple notification to the home authorities is adequate.

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[38]. The monitoring of a bank's securities activities is designed to limit the level of market risk (interest rate and foreign exchange rate risk) that is undertaken by foreign banks operating in the host country's securities markets. This constitutes another serious obstacle preventing the unlimited involvement of credit institutions in the securities markets, along with the standards imposed (adequate capitalisation) by the home authorities.

3.5.2.5 Reciprocity.

The Second Banking Directive considers all credit institutions operating in one member state to be Community banks even if they are branches of third country (non-EC) banks. Therefore, subsidiaries of third country banks already operating in one member state may expand their activities throughout the Community and the Directive suggests the reciprocity rule which dictates the conditions that have to be met for such expansions to be permissible.

According to the reciprocity rule, a non-EC credit institution (already established in the Community) will be authorised to set up branches or subsidiaries in other member states, as long as all member states' banks are offered the same (reciprocal) treatment by the home authorities of the third country (where the applying bank is based). If reciprocal treatment is not offered by the third country, then authorisation is blocked until the third country fully introduces the appropriate measures and provisions. The reciprocity rule is also applicable when a non-EC bank proposes to acquire an equity stake in a Community bank.

However, these proposals initially caused concern and opposition from regulatory and supervisory authorities, as well as from large banks in both EC countries and third countries[39]. It was suggested that the reciprocity rule instead of improving EC-banks' position abroad, would result in third-country retaliatory measures. Furthermore, the expansion of non-EC banks throughout the Community would enhance competition and help to keep the prices of banking services low.

The Commission eventually succumbed to the strong opposition and proposed significant changes to the reciprocity rule (Amending Directive 77/780/EEC, see Annex I). Hence, the reciprocity rule will be considered to be holding not only in the case originally envisaged by the Commission (when the third country offers equal treatment to EC banks),

[39]. The EC countries which were against the proposals included the U.K, Germany, Luxembourg and the Netherlands; see R. Dixon, **Banking in Europe: The Single Market,** (Routledge, London: 1991), page 66.

but also in the case of effective market access, namely when EC banks receive the same treatment that the third country's banks receive in the Community market. Under the new provisions, the Commission will no longer investigate each individual bank's case separately, but it will publish reports (at regular intervals) on the treatment EC institutions receive in third countries. If this treatment is comparable (reciprocal) to the one offered by EC countries, then member states' regulatory authorities do not have to inform the Commission of any application for authorisation (from banks coming from favourable countries) and they simply give them permission to set up business. If the applications for authorisation are coming from banks whose home regulatory authorities do not equally treat EC banks, then the Commission will delay authorisation of these institutions (the Commission does not reject applications outright) while negotiations with the other country's authorities take place (for up to three months). If the negotiations prove to be successful, the third country bank is allowed access to the European market, otherwise a banking license will not be granted.

The Second Banking Directive also includes minimum capital standard harmonisation rules and other prudential measures and regulations, but does not include capital adequacy measures which are essential for the protection of depositors and the stability of the banking system. These measures are included in the Own Funds and Solvency Ratio Directives which are discussed in the following two sections.

3.5.3 The Own Funds Directive.

The Own Funds Directive was proposed by the Commission in September 1986 and was adopted in April 1989. The measures used to describe a bank's own funds vary widely throughout the Community, and the purpose of the Own Funds Directive was to provide a single definition which is to be used in all E.U countries, thus avoiding definition compatibility problems. The own funds measure itself is very important because it is used in calculating the solvency ratios of banking institutions (it is the numerator of the ratio).

The own funds definition proposed in the Directive is basically an amalgamation of the national definitions being used in all E.U member states. It takes into account both "internal elements" and "external elements".

"Internal elements" (also known as "tier one capital") are those items which are at the immediate disposal of the bank and hence they include bank reserves (accumulated profits plus legal minimum reserves), revaluation reserves, paid-up capital and share premium accounts (not including the bank's own shares), funds which are put aside to cover normal bank risks[40] and lastly securities of indeterminate duration.

"External elements" (also known as "tier two capital") are those which are at the disposal of the bank but are not fully owned or controlled by it (or at the bank's disposal but only temporarily). "External elements" include a bank's subordinated loans. Other items are not specifically mentioned, although the Directive suggests certain conditions under which, items will be included in the definition.

A bank's own funds are made up from "external" and "internal" elements which are both represented in equal proportions (50 percent). A bank's additional own funds must not exceed the amount of its original own funds (see also Dixon, 1991). The Directive and its recommendations will be subject to periodic reviews in order to account for new developments in the banking market.

3.5.4 The Solvency Ratio Directive.

The Solvency Ratio Directive was adopted in December 1989 and banking institutions had to comply with its proposals by January 1, 1993, although all banking institutions which applied solvency ratios lower than the proposed (8 percent), were not allowed to further lower these ratios during this three year transitional period. The Solvency

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[40]. These risks are determined by the bank's management and they are then verified by independent auditors and reported to the supervisory authorities.

Ratio Directive aimed to harmonise the various E.U solvency requirements and it proposed more strict solvency standards than the ones which were (at the time) in force in most member states. The numerator of the solvency ratio is already given by the Own Funds Directive and it is a bank's own funds; this Solvency Ratio Directive deals only with the denominator.

This denominator is composed of risk-adjusted assets and off-balance-sheet items. Each category of assets and off-balance-sheet activities is assigned a particular risk weight (corresponding to its degree of risk), and then these weightings are multiplied by the total value of the respective items and finally all these numbers are summed up to give the denominator. The minimum solvency ratio proposed in the Directive is 8 percent. This ratio (along with the risk weightings) may be revised by the Commission, after consultations with the Banking Advisory Committee have taken place. It has been argued (Dixon 1991, Gardener 1992, Vesala 1993) that this risk-adjusted approach to measuring solvency ratios is the most adequate and flexible one, since basic ratios do not distinguish between different degrees of risk.

The Directive provides detailed guidelines in assigning risk weights to different categories of borrowers. It distinguishes three main categories of borrowers: central banks, governments and credit institutions. Each category is divided into domestic and foreign borrowers (E.U and non-E.U respectively)[41]. Then, the various groups of borrowers are assigned risk weightings of 0, 10, 20, 50 and 100 percent according to a list which is included in the Directive.

It is important to note that the provisions contained in both the Own Funds and Solvency Ratio Directives, are in accordance with those reached in the Basle agreement on capital adequacy (see Gardener 1992).

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[41]. In some cases domestic borrowers may be given lower risk weights than foreign borrowers which does not seem to be appropriate, as it is possible that countries like Switzerland are given higher risk weightings than countries like Portugal and Greece (the same might be true for Swiss and Greek banks based on domestic-foreign distinction).

3.5.5 Other proposed measures and guidelines.

3.5.5.1 Recommendation on the Monitoring and Control of Large Exposures.

This Recommendation was published by the Commission in December 1986 and was upgraded to a Directive in 1992 (Large Exposure Directive 92/121). It was primarily designed to limit a bank's exposure to a single client or group of connected clients. All banking institutions have to report to the supervisory authorities annually (in their annual accounts and reports) their largest exposures along with all exposures that account for more than 15 percent of the bank's own funds. The Recommendation provides a detailed list of items which constitute exposures (the list includes both assets and off-balance-sheet items such as guarantees and commitments). The upper permissible limit on the size of a single exposure has been set at 40 percent of the bank's capital and the total limit when all exposures are put together cannot exceed 8 times the bank's capital.

3.5.5.2 Recommendation on Deposit-Guarantee Schemes.

This Recommendation was introduced together with the Recommendation on large exposures and was upgraded to a Directive in 1994 (Deposit Insurance Directive 1994/19). Its sole objective was the protection of depositors in case of a bank failure. Under the Recommendation's provisions, bank depositors are protected in case of bank failures and are guaranteed compensation for any lost deposits. All deposit-guarantee schemes have to meet certain standards which are clearly set out. The Recommendation suggests that such deposit-guarantee schemes must have been introduced in all member states by 1990 (see Appendix 6). However, Recommendations are not legally binding and therefore they may be replaced by Directives if such need arises in the future (one or more member states failing to comply with the Commission's Recommendations, which is a case not been observed as yet).

3.5.5.3 Council Directive of February 1988 on the Reorganisation and the Winding-up of Credit Institutions and Deposit-Guarantee Schemes.

This Directive attempts to bring together the various laws, regulations and administrative provisions concerning the reorganisation and winding-up of banks. It proposes a detailed framework of reorganisation measures set out to restore and protect a bank's sound financial position. The task to reorganise or wind-up a banking institution lies solely with the home supervisory authorities but when such an institution operates in another country, then the responsibility is shared by the home and host authorities alike. The Directive also provides the legal basis for the extension of deposit-guarantee schemes to all Community member states.

3.5.5.4 Council Directive of December 1986 on the annual accounts and consolidated accounts of banks and other financial institutions.

This Directive proposes a universal form for the Community banks' balance sheets, profit and loss accounts, consolidated accounts and notes on the accounts. It describes the layout, the appropriate accounting techniques and the terminology that must be used by all E.U banks, making the exercise of comparing national banks' accounts and balance sheets easier and more precise and ruling out various distortions and misinterpretation of reported figures. This Directive has to be implemented by credit institutions by 31 December 1990 (see Appendix 6).

3.5.5.5 Council Directive of 13 February 1989 on the obligations of branches established in a member state of credit institutions and financial institutions having their head offices outside that member state regarding the publication of annual accounting documents.

This Directive introduced and defined all accounting standards that have to be followed by branches of "domestic" and "foreign" banks (E.U and non-E.U respectively) operating inside the Community. Branches of "domestic" banks do not have to publish separate accounts any more, although they do have to publish consolidated accounts with the parent institution. Branches of "foreign" banks have to publish branch accounts only in the case when their accounting documents and techniques are not equivalent or compatible with those used by E.U banks (as defined in the Annual Accounts Directive).

3.5.5.6 Council Directive on Investment Services in the Securities Field.

The Directive on Investment Services in the Securities Field was introduced in December 1988 and adopted in February 1990. This Directive was put forward in order to cover the legal void around non-bank investment firms which were left out from the Second Banking Co-ordination Directive. Therefore, an investment firm is defined as "any natural or legal person" that offers one or more securities services such as money market services, financial futures and options, exchange rate and interest rate instruments, brokerage services, underwriting, portfolio management, investment advice etc.

Investment companies are free to provide cross-border services throughout the Community and set up branches in other member states without obtaining additional authorisation from the host country regulatory bodies. In other words, they are offered the same treatment as banks (provided in the Second Banking Co-ordination Directive).

As far as stock exchange membership by investment companies is concerned, the Directive fails to remove all remaining barriers and hence restrictions still exist in some member states. The Directive proposes three ways in which an investment firm can obtain membership in another member state's stock exchange: a) by establishing a branch in the host state, b) by acquiring an existing member of the exchange and c) by setting up subsidiaries (not directly incorporated in the parent firm) in the host country. The investment firms that are directly involved in another country's stock exchange have to abide by the structural and organisational rules that are set by the host country's authorities.

3.6 Problems of creating the Single European Market.

The E.U Commission's legislative programme has gone a long way towards harmonising regulations and supervisory controls across E.U banking markets, but there remain many obstacles and certain legal discrepancies that make completion of the single market for financial services problematic.

Vesala (1993) identifies three different areas where national legislation gives rise to distortions in the free movement of banks and banking services. These differences are centred on: a) Reserve requirements, b) Taxation and c) Freedom for member states to use the "general good" opt out to avoid implementing certain E.U legislation.

Different reserve requirements across E.U banking markets may act as an additional tax levied on high reserve requirement banking systems, thus creating competitive anomalies. Variations in national taxation regimes hamper the free cross-border provision of financial services. Molyneux (1993) has observed two important types of tax barriers that remain unaffected by E.U Directives:

a). Tax measures, such as the withholding tax, which directly affect "foreign" E.U financial institutions providing banking services in another E.U country. The amount of withholding tax applied to interest paid to the domestic lenders will be fully set off against the corporation tax paid by the domestic lenders on their profit margins and any excess amount is refunded. In the case of foreign lenders, this tax is a final, non-refundable tax.

b). Taxes which do not directly affect "foreign" E.U banks, but make their products and services more expensive to domestic customers (Dassesse (1993) provides numerous examples of preferential tax treatment favouring domestic banks to the expense of "foreign" banks).

Certain legal discrepancies and other obstacles may also arise when national governments use the principle of the "general good" to opt-out of E.U legislation. Member states may use the "general good" opt-out for reasons of public morality, public policy, public security or protection of health to circumvent the general principle of freedom of movement for goods and services[42]. Katz (1992) has argued that "general good" opt-outs were allowed to stand by the European Courts in cases where: a) they were not linked with other laws already harmonised across the E.U, b) they were not duplicative of laws already applied by home states, c) they were applicable to all persons and undertakings in the host country and d) they were necessary to protect the interest at stake and if they were deemed to be proportional to the protection of that interest. This provided member countries a device to opt-out of E.U legislation with some degree of autonomy.

It is therefore clear that differences in reserve requirements, taxation regimes and the freedom to exercise "general good" opt-outs raise doubts as to whether a true Single European Market for financial services will ever be achieved. However, the E.U Commission has taken significant steps towards this direction with the implementation of an extensive legislative programme. The following section will highlight the differences between the pre-1993 regulatory regime (in France, W. Germany and the U.K) and the post-1993 Single European Market regulatory environment.

3.7 The European regulatory environment after the completion of the Single European Market.

This section describes the post-1993 E.U regulatory regime pointing out in what respect and how it differs from the pre-1993 framework of regulations.

Capital adequacy.

The post-1993 regulatory structure (Own Funds, Solvency Ratio and Capital Adequacy Directives) requires that the ratio of banks' total capital base to risk-adjusted assets must be 8 per cent. This rule was already in place in the British pre-1993 structure, but

[42]. The Treaty of Rome contains provisions that accomodate several exceptions to the principle of free movement for goods, services, people and capital (Treaty Establishing the European Economic Community, Article 36, 298 U.N.T.S 3 (1957).

different regulations existed in France and W. Germany. Therefore, French and W. German banks have had to adjust to observe the new rules. The E.U Commission's Own Funds and Solvency Ratio Directives also propose universal definitions of what constitutes a bank's own funds, fixed assets, liquid assets etc., thus eliminating problems arising from slight differences in definitions across European countries.

These capital adequacy rules form a vital part of the harmonisation of prudential standards throughout the E.U[43]. Dixon (1991) argues that the imposition of these rules were necessary for two reasons. Firstly, to protect investors and depositors and ensure the stability of the banking system and secondly, to promote and guarantee fair competition among E.U banking institutions in the Single European Market.

The E.U Capital Adequacy Directive (CAD) came into effect in the U.K on 1 January 1996[44]. Prior to the implementation of the Directive, the Bank of England issued two Policy Notices (S&S 1995 2 and S&S 1995/4); the first Policy Notice was issued in April 1995 and the second was issued in November 1995 and clarified areas of the new requirements where necessary. The Own Funds (OFD) and Solvency Ratio Directives (SRD) were implemented by 31 December 1992. The Bank of England's Notice (S&S 1995 5) issued in December 1995 implemented amendments to these two Directives lowering the risk weighting for the European Investment Fund from 100 percent to 20 percent and excluding audited interim profits from banks' own funds (see Appendix 6).

France implemented the CAD and the OFD by 31 December 1992, and the SRD by 31 December 1991[45] (see Appendix 6). Germany implemented the OFD and the SRD by 31

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[43]. For an economic assessment of capital requirements in the banking industry and on regulating bank capital adequacy and bank risks see Koehn and Santomero (1980), Kim and Santomero (1988), Grouhy and Galai (1986) and Bailey and Valenza (1990).
[44]. See *Bank of England*, **Annual Report under the Banking Act 1995/96** (Feb.1996).
[45]. See *International Financial Law Review: Special Supplement International Banking*, France, **Euromoney Publications** (Sept. 1992).

December 1992 (see Appendix 6). There are also plans to introduce an Act amending the Banking Act of 1985 translating the CAD into German law[46].

Large exposure.

The post-1993 unified market calls for the imposition of a maximum allowed limit on the size of a single exposure and suggests that this limit be set at 40 per cent of a bank's capital. The total permissible limit for all large exposures (those that account for more than 15 per cent of a bank's own funds) cannot exceed 8 times the bank's capital. These rules are somewhat similar with the pre-1993 regulations in place in France and W. Germany, but contrast sharply with the British pre-1993 regulatory regime which does not explicitly impose limits on the total permissible amount of large exposures. When a single loan reached 10 or 25 per cent of a bank's capital, the bank was required to get approval by the supervisory authorities. However, it was in the British supervisory authorities' responsibility to make sure that banks were sound and not overexposed.

The E.U Large Exposures Directive (LED) was implemented in the U.K and France by 31 December 1993 (see Appendix 6). In Germany the LED was incorporated into German law on 31 December 1995 with the Fifth Act amending the Banking Act of 1985.

Investment restrictions.

In the post-1993 European unified market, a bank's participation in a non-financial company cannot exceed 10 per cent of the bank's own funds and the total value of all its participations cannot exceed 50 per cent of its own funds. The introduction of this rule would be expected to have had the largest impact in the U.K and W. Germany where there were no investment restrictions under the pre-1993 regulatory framework. It also reduces a French bank's maximum permissible share in a non-financial company (from 20 to 10 per cent). Consequently, the creation of the European Single Market does not only mean the

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[46]. See P. Molyneux, **Banking in the E.U and Switzerland**, (Financial Times 1996: F.T, London).

abolition of trade barriers, regulations and restrictions but it also means the imposition of new rules, as in this case of new investment restrictions.

Foreign exchange exposure.

The pre-1993 regulatory structures in France, W. Germany and the U.K require the implementation of strict rules regarding a bank's foreign currency exposure. According to these rules, a bank's net position in each foreign currency cannot exceed 15 per cent of the bank's adjusted capital base for British banks, 15 per cent of a bank's own funds for French banks and 30 per cent of a bank's equity for W. German banks. The post-1993 proposed regulatory regime does not provide for specific foreign currency exposure regulations.

Deposit protection schemes.

The E.U Commission with its Recommendation of 22 December 1986 (upgraded to Directive in 1994) requires the introduction of deposit guarantee schemes in all member states. Pre-1993 legislation in the three countries in our analysis provided for the setting up and operation of such schemes. The post-1993 banking environment requires minimum harmonisation of all existing supervisory standards and guidelines.

The Credit Institutions Regulations that came into effect on 1 July 1995 amended the U.K Deposit Protection Scheme to meet the requirements of the E.U Deposit Guarantee Schemes Directive. These amendments increased the maximum level of protection for an individual depositor from 75 percent of £20,000 to 90 percent of £20,000 (see Bank of England 1996). France and Germany have so far (June 1996) not implemented the E.U Deposit Guarantee Schemes Directive (see also Appendix 6).

Freedom of establishment.

Pre-1993 regulations obliged E.U banks wishing to open up branches in another member state to seek prior approval from the host country's central bank. These restrictions are no longer relevant in the post-1993 unified banking market. Any licensed bank operating in one member state can open branches anywhere in the E.U.

Endowment capital.

Branches of foreign banks are not obliged to maintain minimum levels of endowment capital in the post-1993 banking markets in contrast to pre-1993 legislation which provided for specific provisions regarding endowment capital in France, W. Germany and the U.K.

Home and host country control.

Home and host country authorities are to share responsibility in supervising domestic and foreign banks in the post-1993 unified market, whereas in the pre-1993 banking scene this task was exclusively exercised by the home regulatory authorities.

The E.U Commission put forward all these legislative measures and proposals with the aim to establish a true Single European Market for banking services. A comparison of the pre-1993 regulatory regimes in place in the three countries under investigation and the post-1993 European unified banking environment, seems to suggest that the new regulatory framework is different in many respects than the pre-1993 one.

The most important measure that greatly affects European banking markets is the "single banking license" rule, giving all member states' banks the freedom to conduct their business anywhere across the E.U. European banks could open up branches in other E.U countries in the pre-1993 banking environment, but they had to obtain a license by the appropriate regulatory authorities.

The minimum harmonisation principle of all pre-1993 supervisory standards and guidelines is proposed in order to prevent banks establishing their home base in member states where the regulatory framework is most favourable (less rules and regulations, better deposit protection schemes etc). For example, banks operating in member states where there is a favourable deposit guarantee scheme may be able to attract a greater volume of deposits than banks in member states where depositos' protection is not as good. On the other hand, the average consumer of banking services might not be aware of the existence of such differences across European banking systems and subsequently advantages of that sort may not be fully exploited by banks.

Finally, the introduction of a universal form for banking balance sheets and profit and loss accounts will make the task of supervision and monitoring by home and host country regulatory authorities much easier, and comparison of banking data statistics more accurate.

3.8. Recent legislation.

3.8.1. U.K.

The Investment Services Regulations were introduced in December 1995 to update national law to comply with the E.U Investment Services Directive, which subsequently became effective from 1 January 1996 (see Bank of England 1996). The primary aim of the Ivestment Services Directive is to provide a single European "passport" to investment firms and to make some changes to the rules governing access to regulated markets.

In December 1995, the Bank of England issued Policy Notice S&S 1995 3 on the netting of counterparty risk associated with sale and repo agreements, and draft rules on over the counter derivatives. It set out the legal requirements that authorised institutions must meet before the Bank treats the counterparty credit risk arising from such transactions.

In March 1996, the Bank introduced new arrangements for banks employing the replacement cost method for calculating the credit exposure arising from off balance sheet contracts. These arrangements were contained in the Bank's Policy Notice S&S/1996/4 and became effective from 1 July 1996. The new figures introduced with these rules, apply to the potential future exposure on contracts concerning equities, precious metals other than gold, and other commodities and also to contracts of greater than five years residual maturity, whereas, the use of the original exposure method was limited only to contracts written in the banks' books (interest rate, foreign exchange and gold contracts).

In January 1996, the Bank amended its 1992 Notice on the "Measurement of Liquidity" with the Policy Notice S&S/1996/1. The new rules extended the range of marketable securities which can be regarded as sight assets for the purposes of calculating liquidity mismatches. The Policy Notice S&S/1996 8 of April 1996, amended the Bank's supervisory treatment concerning the securitisation of revolving credits. This Notice lifted the previously existing general limit on the amount of outstanding revolving credits a bank could securitise at any one time.

The Bank of England is expected to introduce legislation by July 1996 to harmonise national law with the E.U Directive to Reinforce Prudential Supervision within the E.U following the Collapse of BCCI (known as the BCCI Directive). This Directive was adopted in June 1995 and must be implemented by member states by 18 July 1996. The Directive contains four main provisions: a) it gives supervisory authorities powers to refuse authorisation in cases where group and ownership links prevent effective supervision, b) it requires financial undertakings to have their head office in the same member state where they have their registered office, c) it allows a widening of the range of disclosure gateways allowing supervisors to the bodies responsible for the detection and investigation of breaches of company law (including external ispectors) and d) member states must place a duty on auditors and experts to report material breaches of laws (and other concerns) to the supervising authorities.

3.8.2. France.

In 1990, banking legislation introduced various preventive measures against money laundering[47]. Credit institutions are obliged to notify the Finance Ministry of any suspected drug-related funds or transactions. Moreover, credit institutions are required to scrutinise transactions which are unusual and/or involve large amounts and must keep written records of these transactions for inspection.

As from 1 January 1993, the tax treatment of deposit accounts and money-market capitalisation funds is harmonised in an effort to stop the flight of individual funds from bank deposits into more tax-efficient investments such as money-market capitalisation funds.

In a recent development, the regulation in Decree 94-780 of 31 August 1994 allowed variable capital investment companies and open-ended mutual funds to undertake derivative business with foreign banks[48]. This liberalisation provides greater freedom for French banks to determine which counterparties to use in swap market operations. For example, whether to use London or New York markets. Moreover, the changes in regulations have removed a number of market distortions, to increased opportunities and allowed French banks to internationalise their business and become more efficient.

3.8.3. Germany.

In October 1995, the Federal Banking Supervisory Office (FBSO) announced "Minimum requirements for the trading activities of credit institutions", outlining the capital requirements for foreign exchange, securities and derivatives transactions (see Molyneux 1996). Furthermore, the Fifth Act amending the Banking Act of 1985 took effect on 31

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[47]. See *International Financial Law Review: Special Supplement International Banking*, France, **Euromoney Publications** (Sept. 1992).

[48]. See S. Boujnah, "Foreigners wider access to French markets", **Euromoney** (Oct. 1994, p. 125).

December 1995 and incorporated the E.U Second Consolidation Directive and the E.U Large Exposures Directive into German Law. The large exposures provisions of the Banking Act are accompanied by the Large Exposures Regulation issued by the FBSO; this Regulation prescribes the weights to be applied to the risk assets that are included in the large exposures calculation.

The introduction of a Sixth Act amending the Banking Act of 1985 is currently pending. This Act is expected to implement the E.U Investment Services Directive, the E.U Capital Adequacy Directive and the "BCCI Directive" (E.U Directive to Reinforce Prudential Supervision within the E.U following the Collapse of BCCI).

Moreover, as from 1 January 1993 a general withholding tax came into effect for non-residents (25 percent on dividends, 30 percent on interest and 25 percent on royalties). On 1 January 1995, the Second Statute for the Promotion of Domestic Financial Markets came into effect; this law promotes securities trading in Germany. On 1 July 1995, a new form of partnership company was created (Partnerschaftgesellschaft), filling the gap between limited liability partnerships (GmbH) and partnerships covered by civil law.

3.9. Conclusion.

This chapter has described the pre-1993 regulatory structure of the banking systems of the U.K, France and W. Germany and set out the E.U's legislative measures (Directives), the implementation of which brings forward the establishment of the Single European Market in financial services.

The post-1993 Single European Market is an integrated unified market comprising all 12 member states' national markets. Freedom of establishment rules guarantee the operation and access of all members' banks into each other's home market. Home and host country control rules were devised to ensure that the single market is sufficiently supervised and monitored. Minimum harmonisation rules were proposed to prevent the concentration of banks in those countries which would retain the lower standards. Reciprocity rules were adopted to make sure E.U banks are offered the same treatment and opportunities abroad as the ones offered by the E.U to foreign banks operating in its market. Own funds, solvency ratios and large exposures standards and regulations were designed to ensure the soundness and efficient operation of the banking system and reduce the possibility of bank failures. The creation of a deposit guarantee scheme was made compulsory for all member states to protect all E.U depositors and prevent any market distortions from taking place (depositors preferring markets which offer deposit schemes to markets which do not).

The establishment of this Single European Market in banking services was expected to bring about many economic benefits through increased competition, since many more banks now have access to the integrated European market. Although the majority of physical and technical barriers for the free provision of banking services throughout the E.U have been removed, some barriers remain. For instance, *de novo* entry into another state's market may be less preferable than entry by other means (for example acquisition) from the bank's point of view since the costs involved (of setting up new branches) are substantial. Furthermore, domestic customers might favour domestic banking institutions and might feel unhappy to start doing business with "foreigners", even if they offer better or cheaper services. Banks might instead choose to enter another E.U market by acquiring a domestic bank or by merging with one or more Community banks. This way they will be able to take advantage of an already established branch network and the knowledge and expertise of the domestic bank's staff and management.

This chapter has also presented a comparison of the pre-1993 regulatory regimes in place in the three countries under investigation and the post-1993 European unified banking environment. This comparison seems to suggest that the new regulatory framework is different than the pre-1993 structures and the impact of the new regulatory regime on the biggest European banking systems is widely predicted to be significant.

The following chapter will present a detailed literature review of structure-conduct-performance studies in banking and Chapters 5, 6 and 7 will try to determine the effect of market structure on banking performance by using banking data from financial institutions operating in three E.U national markets, namely, the U.K, France and W. Germany. We will also evaluate whether economies of scale really do exist in the three above mentioned banking markets by testing different translog cost functional forms for each market. Having determined the effect of market structure on banking performance characteristics, the impact of the Single European Market on individual European banking systems will become clear. In other words, if we establish a relationship between changes in competition and changes in different banking performance measures, we would be able to assess how the unified European banking market has affected the operation, performance and conduct of European banking systems.

CHAPTER 4.

THE SCP RELATIONSHIP IN BANKING: A LITERATURE REVIEW.

4.1. Introduction.

This chapter provides a detailed literature review of the application of the s-c-p paradigm in banking markets (primarily in the U.S.A). The rationale for empirically estimating this relationship is presented in Section 4.2, while Section 4.3 sets out the standard s-c-p model, variations of which have been widely applied to the banking industry. Section 4.4 reviews the empirical evidence on the nature of the relationship between market concentration and two of the main measures of bank performance: profitability and interest rates on deposits and loans. This section also discusses various behavioural models of banking structure and performance. The findings of international studies that have examined the concentration-performance relationship are presented in Section 4.5. Section 4.6 points out the limitations of testing for the s-c-p relationship in banking and Section 4.7 discusses Berger's (1995) approach in bringing efficiency directly and explicitly into the profit-structure relationship. Finally, Section 4.8 is the conclusion.

4.2. The rationale for testing the s-c-p relationship in banking.

Studies on the structure-conduct-performance paradigm, apply the widely used economic principle, that the degree of competition among firms in a market is influenced by the degree of concentration in that market. Markets that are dominated by a few very large firms are viewed as less competitive than markets where the number of players is great, since effective collusion becomes much more difficult. Consequently, firms in less competitive environments charge higher prices and reap monopolistic profits. This framework has been widely applied to various industries including the banking industry.

The rationale for testing the s-c-p framework for the banking industry is to address three main questions as Heggestad (1979) has noted:

" 1. Does market structure matter in banking markets, or is the industry so highly regulated that market structure is not an important/relevant factor in determining market performance?

2. Which aspects of market structure are the most important, and, therefore, which type of regulations and regulatory reform have the greatest impact?

3. What aspects of bank performance are most sensitive to differences in market structure? " (p. 450).

Therefore, the main aim of the s-c-p studies is firstly to determine which aspects of market structure are the most important (if they are important at all) and secondly which aspects of bank performance are the most sensitive to changes in market structure. Once these issues have been addressed, then regulators would be able to undertake appropriate measures to ensure the relevant order of a banking system that best serves the public.

If the evidence suggests that bank performance is not affected by changes in market structure, then it must be other factors that influence bank performance (such as different forms of bank organisation). In such a case the banking authorities would have no reasons to be concerned about bank mergers and takeovers and therefore, antitrust laws and restrictions could be eased. On the other hand, if bank performance is found to be significantly infuenced by market structure, then the regulatory authorities must ensure that competition is enhanced by thoroughly scrutinising all proposed mergers and acquisitions and stopping the ones that will significantly alter existing market conditions.

Furthermore, there are two important rationales for testing the s-c-p paradigm in European banking markets. Firstly, llittle evidence has been reported on the structure-performance relationship in European banking markets and such an investigation would provide useful insights of the workings of the banking industry to central authorities, bankers and policymakers. Secondly, once the nature of the structure-performance relationship is established and the effect of changes in concentration on banking characteristics is measured, we may draw some conclusions and attempt some predictions regarding the likely consequences of the creation of the Single European Market on the banking sectors under study.

4.3. The s-c-p model as applied to the banking industry.

Most U.S studies investigating the structure-performance paradigm have used a model of the following general form:

$$P \quad f(CR, S, D, C, X) \qquad (1)$$

where P a performance measure

CR a concentration measure

S other market structure variables (such as proxies for barriers to entry)

D variables reflecting market demand conditions

C – variables reflecting differences in costs across firms

and X control variables related to specific product characteristics

These studies have mainly used linear multiple regression analysis to explain variations in the dependent variable (the performance measure) caused by changes in the independent variables (variables on the right hand side of equation 1). This technique shows whether there is a statistically significant relationship between bank performance (dependent variable) and market structure (one of the independent variables).

Authors of s-c-p studies have used a wide variaty of bank performance measures as dependent variables. There are two types of bank performance measures: a) those relating to the price of a particular product or service and b) different measures of profitability. The most commonly used bank performance measures of the first type include (reported in U.S studies over the last thirty years): average interest rates charged on loans, average interest rates paid on deposits and average service charges paid on demand deposits. The most widely used profitability measures are return on assets and return on capital (net income divided by total assets and net income divided by total capital respectively) (see Gilbert 1984).

Many scholars of banking organisation (Gilbert 1984, Smirlock 1985, Fortier 1988 and others) have correctly pointed out certain shortcomings in the construction of average interest rate variables. These average measures (ratios) combine flow variables (interest rates) with stock variables (i.e loans outstanding at the end of the year) and therefore the constructed measure is not the actual precise average interest rate. Furthermore, the value of these ratios will be different according to how prices are defined (using average or year-end values).

Moreover, some U.S studies have used average interest rates paid on deposits for tests of the s-c-p relationship in banking markets that were operating under the restriction of regulation Q (imposed maximum levels of interest rates payable on deposits) and consequently these results may not be relied upon since the endogenous variable (performance measure) is exogenously affected.

On the other hand the use of profitability measures as dependent variables in the s-c-p framework, although, suffering from some of the same shortcomings (combining flow variables, namely, profits, with stock variables such as assets or capital) has been more successful in reporting a statistically significant relationship between market structure and bank performance.

As regards the use of market structure variables, the most commonly applied measures include concentration ratios (1, 2, 3 and 5-firm deposits), the Herfindahl index (Weiss (1969), Yeats (1974), Heggestad and Mingo (1976), Mingo (1976) etc) and simply the total number of loans in the market (Kaufmann (1966), Aspinwall (1969), Emery (1971), Whitehead (1977) etc). Some commentators employed measures such as the Gini coefficient (Beighley and McCall (1975), Rose and Fraser (1976)) the Hall-Tideman index, entropy and numbers equivalent (which is simply the inverse of the Herfindahl index; Rose and Fraser (1976), McCall and Peterson (1980)). All these market structure variables are based on values for total bank deposits, which may not seem relevant when one tries to determine the relationship of market structure and performance in a particular loan market category. However, since the degree of concentration is highly likely to be very similar across a wide range of banking products and services, many authors have concluded that taking a deposit-based market structure variable will not significantly affect the expected findings.

Moreover, most U.S studies have used a simple concentration ratio, although this measure does not reflect the total number of firms in the market nor does it account for bank size distribution in the market. A measure that accounts for both the total number and distribution of firms in the market is the Herfindahl index, and it is widely regarded to be preferable in studies of the s-c-p relationship.

We have seen how market structure is measured in banking studies, but we have not yet defined banking markets. In most of the U.S studies banking markets are approximated by the Standard Metropolitan Statistical Area (SMSA) for urban banks and by counties for other banks. This approximation for banking markets is also employed by bank regulatory authorities since these geographical areas provide readily available banking data and, therefore, it seems that the definition of banking market has been chosen on the basis of the relativity of ease in obtaining data and not because it contains the relevant market area for banking services and, consequently, this definition may not be entirely appropriate.

The s-c-p models also incorporate other market structure variables such as barriers to entry because their existence or absence has a direct impact on the prevailing degree of competition in a particular market. If the number of firms in a market increases (which is likely in the absence of barriers to entry), the market will become more competitive and less concentrated and this may influence the performance of the rival firms. This particular case is known as a contestable market, a theory developed by W. J. Baumol (1982). A perfectly contestable industry is one in which there are no barriers to entry at all (as in perfect competition). However, unlike perfect competition, in a perfectly contestable industry it is possible for a monopolist to exist even when no barriers to entry prevent other firms from competing. Since there are no barriers at all the potential threat of entry that the monopolist faces should induce marginal cost pricing and efficient production[1]. Barriers to entry, therefore are considered to be important determinants of performance and they have been included in various s-c-p studies (see Evanoff and Fortier 1988) to evaluate their impact on bank performance and to determine how they relate to concentration levels.

Several U.S studies indicate that barriers to entry play a significant role in determining bank performance, suggesting that higher entry barriers result in greater profits. These studies (Rhoades 1980, 1981, 1982a, Rhoades and Rutz 1982, Berger and Hannan 1989, Evanoff and Fortier 1988) have analysed the performance of banking firms under different environmental structures, namely unit versus statewide branching states. In unit banking states, banks are not allowed to expand by opening-up new branches (and therefore exert greater market power and harvest higher profits), whereas banks in statewide branching states may expand their operations and are not restricted at all.

Furthermore, the s-c-p model includes a series of other market structure variables that are believed to influence bank performance such as the market share of banks, the number of bank branches, binary variables distinguishing between bank and non-bank financial intermediaries, binary variables distinguishing between banks that are members of Holding Bank Company Organisations (HBCO's) and banks that are affiliated (there are certain regulatory restrictions that apply for HBCO's that may affect performance).

Measures of market size and market growth are the most widely used independent variables accounting for market demand conditions (variable D in equation 1). Market size

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[1]. It is also possible to have high levels of competition even when only a few firms are operating in a market, when the costs of entering or exiting the market can be recovered by the firms.

(measured by total bank deposits or total assets) is assumed to affect bank performance since the larger the market the greater the incentives for potential entrants will be and this may result to increased competition. Market growth (change in the total volume of deposits or loans) is used to account for demand factors, assuming that the greater the demand for banking services the higher their prices are likely to be. Other variables accounting for different demand conditions across banking markets are per capita income and population (or growth in per capita income and population).

As regards independent variables reflecting differences in costs across firms, studies have incorporated measures such as banking wage rates (proxy for the cost of labour), interest rates paid on deposits (proxy for the cost of funds), and total banking assets (proxy accounting for size-induced cost differences across banks arising scale economies).

Finally, several authors have used a wide range of other control variables that are related to specific product characteristics. For example, studies that have used deposit or loan rates as dependent variables have also included variables accounting for characteristics such as type, size and maturity of these deposits or loans. Furthermore, some studies have used the loans-to-assets ratio (and capital-to-assets or equity-to-assets ratios) to account for different levels of risk across bank portfolios (lower ratios implying riskier portfolios).

4.4. Concentration and performance: empirical evidence.

4.4.1. Concentration and interest rates.

Studies reporting a significant relationship between market structure and interest rates include: Schweiger and McGee (1961), Edwards (1964, 1965), Kaufman (1966), Meyer (1967), Philips (1967), Bell and Murphy (1969), Aspinwall (1970), Jacobs (1971), Stuhr (1972), Greer (1974), Yeats (1974), Beighley and McCall (1975), Heggestad and Mingo (1976, 1977), Rhoades (1977, 1981), Scott (1977), Whitehead (1978), Savage and Rhoades (1979), Rhoades and Rutz (1979), Rose and Scott (1979), McCall and Peterson (1980), Marlow (1982), Hannan (1983), Hanweck and Rhoades (1984) and Berger and Hannan (1989).

Studies rejecting the s-c-p hypothesis include: Flechsig (1965), Taylor (1968), Klein and Murphy (1971), Fraser and Rose (1972), Fraser, Philips and Rose (1974), Jackson (1974), Yeats (1974), Fraser and Alvis (1974, 1975) Stolz (1976) and Graddy and Kyle (1979).

Inconclusive evidence was reported in the following studies: Fraser and Rose (1971, 1976), Ware (1972), Whitehead (1977, 1978), Rhoades (1979), Harvey (1979), Rose and Scott (1979) and Hannan (1979, 1991).

The data in almost every empirical study have been cross-sectional observations, drawn from a variety of American markets and covering many time periods. In a large country such as the United States, the definition of the relevant market is a very sensitive issue, since banking operations differ considerably in coverage and scope. Therefore, consumer credit and demand and savings deposits services will be offered in a limited or very small area where the bank conducts its business, but demand for large commercial loans and other corporate finance services will cover an area most probably beyond the boundaries of a state. Most studies have used Standard Metropolitan Statistical Areas (SMSA's) as the relevant banking markets. Others have used rural counties or a combination of counties.

There is a wide range of other factors, apart from market structure that influence the pricing of banking services. One should take into account market demand conditions, differences in costs among firms and markets, structural market variables (barriers to entry) and control variables accounting for different product characteristics.

Independent variables used to capture these effects include: average size of loans, average bank size, change in population, percent change in manufacturing employment (alternatively unemployment), percent of loans to different size borrowers, deposits per capita, operating expenses for banks, median (percent change in) family income and per capita income, average costs for servicing deposits and loans, percentages of different categories of deposits and loans to total volume of deposits and loans, growth in bank assets, wage and salary payments and numerous variations of these.

Furthermore, variables measuring riskiness have also been included (provisions for losses from loans as a percentage of total loans, portfolio risk etc), along with market structural variables such as branching law dummies and institutional structure variables measuring competition in the deposit and loan markets (holding company affiliation dummies, dummies accounting for the presence of other credit institutions such as savings and loan associations).

The performance of most of these independent variables is rather mixed (strong performance in some studies and very poor performance in others). One reason behind this, apart from using different markets and samples, is the methodological techniques used in the estimation of the structure-performance relationship. A great majority of the above mentioned empirical studies have used multiple regression to estimate the parameters of the equation which generally is of the following form:

$$IR \quad f(D, C, CR, S, X) \qquad (2)$$

where IR – interest rates paid for deposits and/or charged on loans

D = variables reflecting market demand conditions

C – variables reflecting differences in costs across firms and markets

CR = variables measuring the concentration of the markets

S – structural market variables (proxies for barriers to entry)

X = variables reflecting different characteristics of specific products.

Equation (2) is a reduced-form equation and the estimated coefficients are reduced-form coefficients (combinations of structural coefficients in the unspecified demand, cost, objective and reaction functions incorporated implicitly into the model) as Heggestad (1979) correctly points out[2]. Therefore, the signs and values of the reduced-form coefficients will be a reflection of the signs and values of the structural coefficients which comprise them. These values may be of opposite signs and in fact the effect on the independent variable may be cancelled out which will lead us to conclude that the reduced-form coefficient has no effect whatsoever on banking prices[3].

Some of the studies mentioned above use actual cross-sectional observations on interest rates paid for deposits and charged on loans as their dependent variable. Because of the difficulties associated with obtaining this type of "micro" data, many authors have instead constructed proxies such as interest income earned from loans over total loans or interest expense paid for deposits over total deposits (or alternatively figures for one or two categories of loans and deposits). This proxy is known as the average interest rate paid for deposits and charged on loans. Another performance measure used is service charges on different categories of deposits and loans over total volume of deposits and loans. The use of these proxies has been criticised on the grounds that they are inaccurate, since the numerator is an annual income or expense flow and the denominator is a figure taken from the bank balance sheet (a snapshot of the bank's financial position at a particular point in time), which might be very different from the average loan or deposit balance for the year. However, researchers have continued to use these proxies as a result of the enormous difficulties involved in getting raw data on interest rates.

There is widespread unanimity in the literature as far as the concentration measure is concerned. Authors have used different measures of concentration (one, two, three and five firm concentration ratios, the Herfindahl index, numbers equivalent, entropy etc). The important question to be answered here, is how one measures bank output. Having answered that, one can construct a concentration measure in a market where firms produce that output.

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[2]. A. A. Heggestad, "A survey of studies on banking competition and performance", in F. R. Edwards ed., *Issues in Financial Regulation* (McGraw Hill, New York 1979).

[3]. For a thorough discussion of the appropriateness of the multiple regression methodology, see J. A. Clark, "Single equation, multiple regression methodology. Is it an appropriate methodology for the estimation of the structure-performance relationship in banking?", **Journal of Monetary Economics** (1986), p.p 295-312.

A large number of studies (see Gilbert (1984) for example) have used a measure based on total bank deposits when studying general bank performance, but when studying a specific product (such as interest rates on different categories of deposit), the concentration variable should rather be based on that specific product.

Overall, the explanatory power of the models that test for a relationship between market concentration and interest rates on deposits and loans are not high. Adjusted R^2's ranged between 0.03 to 0.73.

The actual effect of a change in the market concentration ratio by ten percentage points was a rise decline in the interest rate charged on loans/paid on deposits by between 3 and 10 basis points [as low as 0.1 basis points in Rhoades (1981) and as high as 18 basis points in Kaufman (1966)].

All authors that explicitly take into account the role of entry barriers in explaining the s-c-p relationship by including branching law dummies into the model, are unanimous in concluding that the effect of concentration on interest rates was higher in unit branching states and somewhat less so in limited branching states than in statewide branching states.

Berger and Hannan (1989) examine 470 banks in 195 local banking markets over the period 1983-1985. They used three different measures of bank performance, namely, interest paid on Money Market Deposit Accounts, interest paid on Negotiable Order of Withdrawal Accounts and interest paid on 3, 6, 12 and 30 month Certificates of Deposit. The authors' findings suggest that banks in the most concentrated local markets pay interest rates that are between 25 and 100 basis points lower than those paid in the least concentrated markets, depending on the time period examined. These results are quite significant, not only because they support the s-c-p hypothesis, but because of the unusually high reported R^2 (ranging between 0.33 and 0.88).

Furthermore, Calem and Carlino (1989) examine 466 commercial and Federal savings banks spread over 145 SMSA's. They employ interest paid (1985) on Money Market Deposit Accounts and 3 and 6 month CD's as measures of bank performance. Calem and

Carlino's findings are in accordance with Berger and Hannan's (although the explanatory power of their model is much weaker; R^2 range between 0.01 and 0.25). The authors report that a 10 per cent increase in concentration results in a decrease in deposit rates of between 3 and 5.9 basis points.

Gilbert (1984) has correctly pointed out that studies using average loan rates usually yield unsatisfactory results because average loan rates are poor measures of bank performance. On the other hand, studies that use individual loan data collected through survey avoid those measurement problems and support the validity of the s-c-p relationship (although even in these cases the impact of concentration on loan rates is quantitatively small; a 10 per cent increase in market concentration causes changes in loan rates that vary between 0.1 and 18 basis points). However, studies that use individual deposit rates rather than average deposit rates do not take into account the impact of Regulation Q on their interest rates (imposed in the 1960's and 1970's) and therefore the majority of these studies provide biased results. The most recent studies using individual deposit rates do not suffer from this shortcoming and report stronger evidence supporting the s-c-p relationship.

4.4.2 Concentration and profitability.

Authors have reported contradictory results, some indicating a strong relationship and others no relationship at all or one of unexpected direction. Edwards (1965), Kaufman (1966), Vernon (1971), Fraser and Rose (1976), Heggestad (1977), Harvey (1979), Savage and Rhoades (1979), Glassman and Rhoades (1980), Rhoades (1980, 1981 and 1982), Spellman (1981), Rhoades and Rutz (1982), Kwast and Rose (1982) and Clark (1986b) report strong and significant relationships between market structure and bank profit rates. Other studies by Fraser and Rose (1971, 1972), Emery (1971), Ware (1972), Edwards (1973), Yeats (1974), Fraser and Alvis (1975), Mingo (1976), Whitehead (1977, 1978), Rhoades (1979), Rhoades and Rutz (1979), Rhoades and Savage (1981), Wall (1985), Clark (1986a) and Smirlock (1983) report insignificant coefficients of market structure variables. Furthermore, Smirlock (1985) and Evanoff and Fortier (1988) report contradictory results; in some cases strongly supporting the s-c-p paradigm while in others rejecting it.

One obviously would not fail to observe, that the same authors report conflicting results for different periods and different samples. This, of course, is partly due to different methodological approaches and various performance and concentration measures adopted. The profit variable all authors have used, is interest income over total assets (return on assets-ROA) or interest income divided by equity capital (return on capital - ROC). The concentration measures used, varies to a greater extent (one, two, three and five firm concentration ratio, the Herfindahl index, numbers equivalent, entropy etc), with the most popular measure being the three firm deposits concentration ratio. The data samples included small and large institutions from Standard Metropolitan Statistical Areas (SMSA's)-defined to be the relevant statistical banking markets- and from counties drawn from different states (Texas, Iowa, Ohio, Florida etc).

The R^2's were as low as 0.05 and as high as 0.83 to 0.90 (Spellman 1981). The number of banking institutions included in the samples varied widely from a few dozens to 6500 (Rhoades 1982).

It has to be pointed out at this point, that studies undertaken on the structure-performance hypothesis fail to test for the effects of regulatory changes on the performance of banking institutions, at least explicitly. Some American authors have compared reported results for different regulatory environments, namely unit banking states versus limited and statewide branching states. Most of them conclude that the effect of structure variables on profit measures was greater in unit branching states than in limited and statewide branching states (Rhoades 1979, 1980, Savage and Rhoades 1979, Rhoades and Rutz 1979 and Glassman and Rhoades 1980). Others including Rhoades 1981, 1982a, Rhoades and Rutz 1982 report no significant variation whatsoever and Vernon 1971 claims that statewide branching states are less competitive than unit banking states.

Another group of authors associated bank profits with banking operating performance (Bryan 1972, Fraser 1976, Gady 1972, Haslem 1968, 1969). They conclude that operating expenses is the most significant variable determining bank profitability, although the theoretical relationship between earnings and costs remains vague, since there are great difficulties with the availibility of the most appropriate data.

Some studies have also related variations of bank earnings to variations in bank portfolios. The results indicate (Hester and Pierce 1975, Hester 1979, Bond 1971) that rates of return vary significantly across operations.

However, the structure-performance hypothesis has been challenged on other grounds as well. Demsetz (1973), developed the relative efficiency hypothesis arguing that greater profitability stems not from greater market share, but from differential efficiency between institutions operating in the same market. Authors have tested this hypothesis, provide evidence supporting it (Smirlock 1983, Glassman and Rhoades 1980). However, many authors have taken into account this influence by including an operating expenses variable in the estimable models. This extension of the s-c-p paradigm will be discussed in more detail in section 6.

One other extension of the literature that has not been thoroughly investigated, if at all, is the contestable market theory[4] point of view, which postulates that market structure and competition are determined by industry characteristics such as barriers to entry, and therefore barriers to entry should be the most important determinant of performance measures. Several studies, as mentioned above, indicate that barriers to entry play a very significant role in determining bank performance (studies analysing different environmental

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4. Contestability theory was developed by W. J. Baumol (1982). A perfectly contestable industry is one in which there are no barriers to entry at all (as in perfect competition). However, unlike perfect competition, in a perfectly contestable industry it is possible for a monopolist to exist even when no barriers to entry prevent other firms from competing. Since there are no barriers at all, the potential threat of entry that the monopolist faces should induce marginal cost pricing and efficient production. Therefore, barriers to entry are considered to be very important determinants of performance.

structures-unit versus statewide branching states), but failed to explicitly introduce barriers to entry into the analysis, through a contestable market theory framework.

Some of the most commonly used independent variables, in the structure-performance framework along with the market structure variable are: market size, bank size, market growth, bank market share growth, per capita income, change in per capita income, dummies accounting for branching law restrictions, number of potential entrants etc. The evidence presented on the performance of these variables is inconclusive.

4.4.3 Concentration and non-price competition.

Some scholars of banking organisation have associated concentration with other banking characteristics apart from performance measures. Edwards (1973) tries to find whether there is any linkage between concentration and banking advertising intensity by using a sample of 36 of the largest American banks in 23 SMSA's. His results suggest that there is no association between market structure and advertising intensity. However, White (1976) reported that there exists a strong statistically significant relationship between concentration and service quality. Higher concentration was found to be related with lower levels of service quality and lower concentration was associated with higher levels of service quality. Service quality was measured by the number of branch offices in a number of different SMSA's (40) on the assumption that the more branches a bank operates the greater is the quality of the service it offers to its customers.

4.4.4 Behavioural models of banking structure.

4.4.4.1 Expense-preference behaviour.

Another objective apart from maximisation of profits, might also be to engage in expense-preference behaviour, that is directing more resources to managerial expenses (for whatever reasons there may be) rather than reporting higher profits. The opinions expressed on this matter are divided with some people providing strong evidence to support the hypothesis (Edwards 1977, Hannan 1979, Hannan and Mavinga 1980) and others rejecting it (Rhoades 1980, 1982a, Kalish and Gilbert 1973, Smirlock and Marshall 1983).

Edwards (1977) found strong evidence suggesting that expense-preference plays a significant role in different market structure environments. His results indicate that personnel expenses (wages and salaries) increase with monopoly power. In other words banking personnel expenses tend to be higher in more concentrated banking structures and lower in less concentrated markets (for the years 1962, 1964 and 1966 and a sample of banks spread over 44 SMSA's).

Hannan (1979) confirmed Edwards' findings in his examination of the behaviour of 367 Pennsylvania banks based in 49 local banking markets throughout the state. Hannan reports that banking personnel expenses and the absolute number of bank employees are significantly affected by changes in market concentration. However, Smirlock and Marshall (1983) put forward convincing arguments that seem to weaken the value of the Hannan and Edwards findings. They suggest that if market share is included in the type of equations used by Edwards and Hannan to control for bank size, there is no evidence of expense-preference behaviour and therefore the models used in these studies were misspecified.

4.4.4.2 Market power and risk reduction.

Various authors have argued that banks have objectives other than profit maximisation, namely that the desire to hold less risky assets increases with the degree of market concentration. In other words, banks operating in less competitive markets sacrifice greater profits by holding less risky assets than they would otherwise do. If this is the case, the relation between profit rates and market structure would be very much weakened. Heggestad (1977) and Mingo (1976) tested this hypothesis and they both rejected it.

Heggestad's measure of risk was variability of profit rates, while Mingo used the percentage of bank assets invested in risk free securities, such as U.S government securities. Mingo finds no significant relationship between market concentration and the percentage of bank assets invested in government securities, but he does find that banks in high concentration areas hold higher percentages of their assets in commercial loans than banks in low concentration areas. Rhoades and Rutz (1982) use four different performance measures to account for risk (including variation of ROA - return on assets) and concludes that risk is associated with higher levels of concentration in a sample of 6,500 unit banks operating between 1969 and 1978. However, these findings are of limited importance since the reported R^2's are low, ranging between 0.003 and 0.06.

Moreover, Clark (1986a and 1986b) uses two different methods to investigate the risk factor in the s-c-p paradigm. In his 1986a study using an ordinary least squares (OLS) regression procedure, Clark finds no statistically significant relationship between concentration and risk for a sample of 1,857 banks operating in 152 SMSA's from 1973 to 1982. However, Clark (1986b) uses a two stage least squares (2SLS) procedure and finds that there is a strong relationship between concentration and risk (the standard deviation of return on equity is the risk measure and the sample is the same).

Overall, these contradictory results do not allow us to draw any strong conclusions regarding the concentration-risk relationship.

4.5 Concentration and performance: empirical evidence from international studies.

4.5.1 Bank concentration.

4.5.1.1 International bank concentration.

Studies of international banking concentration generally report conflicting findings regarding the observed changes in concentration levels among the world's largest banks over the last forty years (Aliber 1975, Tschoegl 1982, Rhoades 1983 and Thornton 1991a).

Rhoades (1983) used deposit data for the 100 biggest banks in the world between 1956 and 1980 and concluded that concentration has significantly increased since 1956. However, the share of total deposits held by the five largest banks in the world significantly declined over the period from 22.6 per cent to 13.3 per cent (of total deposits held by the 100 largest banks), whereas banks ranked 26-50 increased their overall share of total deposits from 20 per cent in 1956 to 25.9 per cent in 1979.

Aliber (1975) and Tschoegl (1982) examining different time periods suggest that concentration in international banking markets tends to decrease rather than increase. Aliber compared the share of deposits held by the world's 10, 20 etc. banks (as a percentage to the total volume of deposits held by the world's 100 largest banks) between 1964 and 1974 and found that there was no significant change in concentration over the ten year period. Tschoegl, on the other hand, studied the period 1969 to 1979 and concluded that international banking concentration decreased substantially. His methodology consisted of applying a set of measures of concentration (Herfindahl, Hymer and Pashigian indexes, Theils entropy measure) on the world's 100 largest banks' asset data and the top 20 medium-term Euroloan syndicators (1977 to 1979).

Thornton (1991a) applied Rhoades' (1983) methodology on the world's 100 largest banks' asset data (obtained form *The Banker*) for the period 1979 to 1989. Thornton's findings suggest that the share of worldwide banking assets held by the 100 largest banks decreased since 1979, but the five largest banks substantially increased their share of world banking assets. Thornton's analysis also shows that Japanese banks grew significantly between 1979 and 1989, primarily at the expense of U.S and German banks.

4.5.1.2 Bank concentration across countries.

The most important and detailed study that examines concentration levels across different banking markets has been carried out by Revell (1987)[5]. Revell calculates concentration levels for consolidated and unconsolidated groups[6] of banks in 14 national banking markets for 1983. His concntration measures consisted of 3, 5 and 10-firm deposits and assets ratios. Revell's findings suggest that Sweden, Switzerland, Ireland and Belgium are the most concentrated banking markets in the sample and Germany, Italy and Spain the least concentrated markets, as far as the unconsolidated group of banks is concerned (Japan, Australia and France recorded intermediate concentration levels). Asset concentration ratios in Sweden reached 52.0 and 60.4 for the 3 and 5-firm measures respectively. Corresponding concentration ratios for Switzerland reached 44.8 and 51.5 and for Belgium 35.8 and 52.1 (for the 3 and 5-firm measures respectively). In contrast, Germany recorded 3 and 5-firm concentration ratios of 16.6 and 24 respectively, while the same figures for Italy reached 17.5 and 25.5 (Revell 1987, p.27, Table 2.2).

Moreover, the consolidated group of figures show that the Netherlands and France (72.9 and 53.6 for the 5-firm concentration ratio respectively) were the most concentrated banking markets and Germany and the U.K are the least concentrated (22.0 and 29.7 for the 5-firm concentration ratio respectively).

Revell recognised that studies trying to measure concentration levels across different national banking markets suffer from serious limitations and shortcomings and hence these figures must be treated with great caution and researchers must not lend too much weight in the interpretation of these concentration ratios. Many problems arise as a result of various definitions that outline the scope and activities of different categories of banks and/or banking

[5]. Other studies include: Honohan and Kinsella (1982), Smith and Quinn (1983), Baer and Mote (1985).

[6]. The unconsolidated group of banks includes all individual domestic banks with their scope of business restricted to the domestic market (for Spain and France it takes into account the activities of branches situated outside the country). The consolidated group of figures includes the worlwide business of banks and therefore these figures should be interpreted with great caution.

markets across countries. For example, when calculating concentration ratios regarding the activities of commercial banks, there is the problem of differences in the definition of a commercial bank. Moreover, concentration ratios may also be distorted when mutual and public banks are included with the rest of the banks due to the different scope of business these banks engage in. Therefore, comparisons between national concentration ratios may only be indicative as Revell himself admits that "like is rarely being compared exactly with like" (Revell 1987, p.26).

Honohan and Kinsella (1982) raise various doubts about the suitability of the previously used concentration ratios across national banking markets and argue that one must take into account the effects of different market sizes when constructing concentration ratios. Their preferred measure of concentration ratio is a Herfindahl index that is scaled-up (adjusted) by an amount that is proportionate to the size or the square root of national GDPs. Honohan and Kinsella's findings indicate that one may draw diametrically different conclusions regarding the prevailing degree of concentration in a banking market depending on the concentration ratios used. Hence, Japan which seems to be the least concentrated market in the sample when the Herfindahl index is used, becomes the most concentrated market when Honohan and Kinsella's adjusted Herfindahl indices are used and conversely Belgium and Sweden which seem to be the most concentrated banking markets, become the least concentrated when the new concentration ratios are applied.

4.5.2 International evidence of the s-c-p paradigm.

Studies trying to determine the nature of the relationship between concentration and bank performance characteristics across individual countries include those undertaken by Short (1979), Bourke (1989), Ruthenberg (1991) and Molyneux and Thornton (1992).

Short (1979) finds that concentration is the least important among three factors (the other two being state ownership and capital scarcity) influencing the performance of banks and its overall impact is quantitatively small. Short's sample consists of 60 banks from Canada, Japan and Western Europe and the time period covered by his study is 1972 to 1974. The author associates bank profitability (measured by the ratio of after-tax profits to equity) with the concentration ratios in each bank's national banking system and his results indicate that bank profit rates are only affected marginally by changes in concentration levels (a 30 per cent reduction in the concentration ratio brings about a reduction in bank profit rates of only about 1 per cent).

Bourke (1989) tested the s-p hypothesis using an international sample of banks from the U.S, Europe (U.K, Belgium, Holland, Denmark, Norway and Spain), and Australia. His profit measures included the return on capital, return on assets and value added return on total assets. He used a linear function to test for the effects of concentration on the profit measure.

The author gets conflicting results (a positive and significant relationship when the return on assets and capital were used, but a negative and significant relationship when value added was the dependent variable). He is unable to give a precise explanation for this, although he states that if the sign remained positive, it would have been a clear and strong indication that the expense-preference hypothesis does not hold, since his dependent variable contains staff expenses and provisions for loan losses. He also obtained significant and positive coefficients for the money supply and the deposits and securities variables and insignificant (positive) coefficients for the bond rate and dummie variables. His equations explained between 3 and 53 per cent of the variability of profits.

Ruthenberg (1991) uses international banking data from several countries (EC and non-EC banking markets including the United States, Canada, Japan, Australia, Switzerland, Sweden, Norway, Finland and Israel) for the years 1984 to 1988 and tests for the s-p relationship by utilising a standard translog functional form. The concentration measure used was the Herfindahl index, and the Lerner index was among several performance measures used. Ruthenberg's results indicate that at the sample's concentration means there is evidence of a statistically significant relationship between concentration and performance (Lerner index) as far as the EC markets are concerned, but there is no evidence of such a relationship when the whole sample of countries is used. Moreover, when concentration ratios are allowed to deviate from their sample means, the authors find that there exists a "critical level" of concentration above which there is support for the s-p hypothesis. Ireland, Portugal, Greece and the Netherlands are countries that exhibit a higher level of concentration than the "critical level" of concentration throughout the period.

Finally, Molyneux and Thornton (1992) analysed international banking data obtained from the International Bank Credit Analysis Ltd. (a credit rating agency based in London) for the years 1986 to 1989. The number of banks included in the study ranged from 671 for 1986 to 1,108 for 1989. The authors follow the approach undertaken by Bourke (1989) and link numerous bank profit measures with bank asset concentration ratios and report a statistically significant positive relationship between ROC (return on capital) and concentration. Moreover, Molyneux and Thornton's results suggest that there exists a statistically significant positive relationship between banks' ROC and government ownership as well (contradicting earlier findings by both Short and Bourke who both report negative relationships). The authors suggest that such a positive association is not unexpected since state-owned banks generally maintain lower capital ratios in comparison to their private sector competitors.

The authors also used two value-added measures to test for the expense-preference hypothesis and the Edwards-Heggestad-Mingo risk aversion effect. The value-added measure used to test for the former hypothesis was net profits before taxes plus the ratio of staff expenses to total assets and the results appear to indicate that there is evidence of expense-preference behaviour. However, Molyneux and Thornton found no evidence of the risk aversion effect. The value-added measure included in the analysis to test for this effect was net profits after taxes plus staff expenses plus provisions for loan losses as a percentage of total assets, but the results failed to show any evidence that higher levels of concentration are related with lower loan costs.

4.6 Concentration and firm efficiency: Demsetz's efficiency hypothesis.

Demsetz (1973) argued that greater profitability stems not from greater market share, but from differential efficiency between firms operating in the same market, thus contrasting with the traditional structure-performance relationship. Demsetz's relative efficiency hypothesis suggests that firms that have lower average costs than their competitors (they are relatively more efficient) can maximise profits by reducing prices and expanding firm size[7]. In this case, efficient firms will gain market share which may lead to increased concentration. Firm profits will be increased through greater market share and through greater efficiency.

Demsetz tested his hypothesis by examining the profitability patterns in 95 U.S industries in 1963. He found that concentration was a significant determinant of differences in profitability between large and small firms. However, he also observed that profitability rose with concentration for the largest firms but not for the smaller firms and argued that the leading firms in each industry were larger and more profitable because they were more efficient.

Later studies by Carter (1978), Porter (1979) and Chappel and Cattle (1985) confirmed Demsetz's findings by reporting that the profitability of firms with large market shares is positively related to concentration, whereas the profitability of firms with small market shares is not influenced by concentration.

Other studies undertaken by Ravenscraft (1983), Smirlock et. al. (1984), Schmalensee (1985), Smirlock (1985), Kessides (1987) and Evanoff and Fortier (1988) tried to distinguish between the traditional s-c-p hypothesis and the efficiency hypothesis by including both concentration and market share variables in models explaining profitability. If

[7]. Efficient firms can also maximise their profits by maintaining the same level of prices and firm size.

the traditional s-c-p hypothesis holds, then profitability will be positively related with concentration but not with market shares. If the efficiency hypothesis holds, then only firms with larger market shares will have higher profits. The aforementioned studies have all found that market shares were positively correlated with profitability, whereas concentration was negatively related (or insignificant) with profitability and, therefore, supported the validity of the efficiency hypothesis. Furthermore, Peltzman (1977) found evidence supporting both the traditional s-c-p and the efficiency hypotheses, while Clark et. al. (1984) rejected the efficiency hypothesis. Therefore, the empirical evidence suggests that concentration is affected by both elements of market power and efficiency.

4.7 Limitations of the s-c-p paradigm.

The numerous efforts to empirically estimate the nature of the relationship between concentration and bank performance, as it is predicted by the s-c-p paradigm, suffer from many limitations and shortcomings, which may partly explain the widely conflicting results reported by researchers.

Empirical studies applying the s-c-p paradigm in the banking sector rely on banking statistics data that may not always be accurate and consequently any drawn conclusions based on data depicting a distorted picture may inevitably be suspect. Ira Horowitz[8] put it very eloquently,

"While only God can make a tree, only accountants can make the data upon which economists are forced to rely in their anti-trust analysis. Given that constraint and the resulting data imperfections, all that the economist can be expected to do is to use those data

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[8]. I. Horowitz, "The misuse of accounting rates of return: comment", **American Economic Review**, (June 1984), Vol. 74, p. 493.

to tell a story as to what has taken place in a market over time and to provide the most cogent economic explanation for that history" (p. 493).

Moreover, there are serious defects in the measurement of dependent (bank performance) variables and independent (measures of concentration) market structure variables. Banks are multiproduct firms and a single measure of structure that is extracted from an all-inclusive market area is a risky (and possibly wrong) oversimplification. Hannan (1991) formulated a theoretical framework to accomodate the s-c-p paradigm by employing a neoclassical portfolio choice model of asset allocation. He asserts that:

"Total bank profits are a separable function of a potentially large number of concentration measures that may differ across loan and deposit products as well as across the local markets in which the bank operates. The additivity of this relationship follows from the assumptions of profit maximisation, separable costs, no cross-price effects among loan and deposit categories and a security rate that does not vary with bank *i*'s security holdings. ..... Failure of these assumptions to hold would not change the implication that total profits of the bank are a function of the structure of all the markets in which the bank participates. However, since profits attributable to each activity would be dependent on the structure of markets other than the market for the activity itself, the simple additivity of the relationship would not follow" (p. 76).

Thus, a model that takes into account concentration ratios in all the markets and activities that a bank participates in may be more appropriate and, therefore, the empirical application of such a model could produce more robust results.

There are serious limitations in the selection of the appropriate measures of performance as well. A great majority of studies relate the prices of a single product to overall measures of monopoly power, while banks are multiproduct firms. Data availability restrictions force the inclusion of proxy variables which may not be adequately befitting and therefore the predicted size and sign of estimated relationships may be distorted. An example of a widely used proxy variable is the net interest income variable which is used in the place of interest rates charged on loans and interest rates paid for deposits.

The s-c-p paradigm implicitly assumes that banks' sole objective is maximisation of their profits. However, this may not be the case and managerial objectives may vary systematically with firm size and market power. As bank size and profits are increased managers may adopt expense-preference behaviour and choose to spend more on managerial expenses rather than reporting higher profits (for whatever reasons there may be). Such behaviour would obviously weaken the structure-performance relationship. Moreover, it has been recognised (Clark 1986b and others) that banks' risk-return preferences may vary with the degree of concentration in different markets and the higher the degree of concentration the higher the desire to hold less risky assets will be and therefore equations that ignore risk (tested in most previous s-c-p studies) may very well be mispecified.

Many commentators have correctly pointed out (Evanoff and Fortier 1988, and others) that the existence (or absence) of barriers to entry is very important in affecting bank performance. The threat of competition (potential entry) may lead to lower profits than otherwise, even when concentration is high in a particular market. There is evidence that the structure-performance relationship is strengthened when differences in entry barriers across markets are accounted for (Evanoff and Fortier 1988).

Furthermore, the structure-performance hypothesis as we have seen, has been challenged on other grounds as well. Demsetz (1973), developed the relative efficiency hypothesis arguing that greater profitability stems not from greater market share, but from differential efficiency between institutions operating in the same market. The efficiency hypothesis suggests that it is not collusion which brings about higher than normal profits but rather economies of scale and scope. Authors that have tested this hypothesis, provide evidence supporting it (Smirlock 1983, Glassman and Rhoades 1980) and Evanoff and

Fortier's (1988) findings indicate that when efficiency is accounted for in banking markets, market concentration does not have any impact on banking performance. However, many authors have taken into account this influence by including an operating expenses variable in the estimable models.

Finally, a very significant shortcoming that may result in biasing the findings of past empirical studies is the fact that the role of regulation is universally neglected, although many scholars have recognised that it may have a substantial impact on market concentration and performance. The imposition of Regulation Q (upper ceilings on permitted interest rates paid for deposits) and other various regulatory barriers to entry may lessen competition (price and/or non-price competition) and therefore affect bank performance. Heggestad (1984) points out:

"Regulation does still permit market forces to work but may change the intensity of their effect. For example, liability rate ceilings may make collusion less difficult, as may high entry barriers. Consequently, markets with low concentration may exhibit collusive behaviour. On the other hand, competition may be enhanced by regulatory oversight" (p. 648).

4.8 Berger's efficiency-structure hypothesis.

In earlier sections in this chapter we have shown how the traditional s-c-p hypothesis has been applied to U.S and various international banking sectors. In this section we will discuss Berger's (1995) attempt to directly incorporate into the traditional s-c-p analysis measures of bank efficiency.

Berger clearly distinguishes between four related hypotheses concerning the profit-structure banking relationship: a) the traditional s-c-p hypothesis which suggests that banks charge higher prices for their products and services in more concentrated markets thus attaining higher profits, b) the relative market power (r-m-p) hypothesis which claims that only banks with large market shares are in a position to exercise their market power and gain higher profits by maintaining higher loan rates and lower deposit rates, c) the efficient structure hypothesis (X-efficiency version, e-s-x) which supposes that banks with either superior management or better production technologies or both have lower costs and therefore higher profits and as a result are assumed to gain large market shares that may result in higher concentration levels. Berger points out that in this case, efficiency is the driving force that causes both bank profits and concentration levels to rise (see also Demsetz 1973, 1974 and Peltzman 1977). Finally, d) the efficient structure hupothesis (scale efficiency version, e-s-s) which suggests that banks have equally good management personnel and technology (differences are negligible), but some banks simply produce at more efficient scales than others and therefore have lower unit costs and higher unit profits; these firms are assumed to have large market shares that may result in higher levels of concentration (see also Lambson 1987).

Berger points out that all previous studies that failed to directly measure efficiency simply provide evidence that may be used to support or reject all three a), b) and c) hypotheses because a strong positive relationship between bank profits and market shares is predicted by all three. The basic shortcoming of these approaches is that they may not distinguish whether efficiency is the factor that brings about increases in both profits and market shares (because efficiency is not incorporated in the model), thus rendering the profit-structure relationship a spurious one. Berger's study is the first attempt to include both measures of X-efficiency and scale efficiency into the model and therefore he was able to clearly distinguish between the four main hypotheses and to test whether efficiency has the predicted effects on market structure.

The structural model underlying Berger's efficient structure hypotheses (both e-s-s and e-s-x versions) is the following:

$$\pi_i = f_1 (EFF_i , Z_{im}^1) + e_{im}^1 \tag{3}$$

$$MS_i = f_2 (EFF_i , Z_{im}^2) + e_{im}^2 \tag{4}$$

$$CONC_m = f_3 \text{ (} MS_i \text{ for all } i \text{ in } m \text{)} \tag{5}$$

where π measures profitability, EFF is the efficiency measure (either X-efficiency or scale efficiency), Z represents vectors of control variables, the e's are random errors, m indexes the market and i indexes the banks in each market.

This model predicts a positive profit-structure relationship as a spurious outcome because both profits and structure are affected by efficiency. In equation (3), bank profits are assumed to be determined by cost differences originating from X-efficiency or scale efficiency (depending on which version is tested). In equation (4), it is hypothesised that efficiency is positively related with market structure: more efficient banks are presumed to have greater market shares (this may happen in a number of ways; for more details see Lambson 1987 and Berger 1995). In equation (5) market share is positively related to concentration (most widely used measure of concentration is the Herfindahl index). Consequently, what this model essentially supposes is that more efficient banks have higher profits and higher market shares at the same time (eq. 3 and 4) and that the higher the market share the higher concentration will be.

The structural model underlying the two market power hypotheses (s-c-p and r-m-p) is the following:

$$\pi_i = f_4 (P_i , Z_{im}^4) + e_{im}^4 \tag{6}$$

$$P_i = f_5 (STR_i , Z_{im}^5) + e_{im}^5 \tag{7}$$

$$CONC_m = f_3 \text{ (} MS_i \text{ for all } i \text{ in } m \text{)} \tag{5}$$

where P is a vector of output prices, STR is a measure of market structure (either concentration or market share depending on which hypothesis is being tested). Equation (6), assumes that bank profits are affected by differences in prices of bank products and services and not by efficiency differences, although this model does not rule out the possibility that differences in efficiency may indeed be the true determinant of bank profits. Equation (7), relates bank prices with market structure: banks that operate in more concentrated markets or have higher market shares set higher prices for their products. The efficiency variables may also affect prices if they are included in vector Z, but their effect are assumed here to be negligible. Equation (5) relates market share with concentration as before. Therefore, the profit-concentration relationship comes about in two ways: under the structure-conduct-performance hypothesis concentration affects bank prices and prices affect bank profits and under the relative market power hypothesis market shares affect prices and prices affect bank profits.

Berger then selects a reduced form equation that includes both direct measures of efficiency and nests the four hypotheses and is of the following form:

$$\pi_i - f_7 (CONC_m, MS_i, X\text{-}EFF_i, S\text{-}EFF_i, Z_{im}{}^7) + e_i{}^7 \qquad (8)$$

In equation (8), the coefficients of the exogenous variables are expected to be positive or relatively very small or zero depending on which of the four hypotheses the tests are carried out for. Therefore, under the s-c-p hypothesis, CONC has a positive coefficient and the remaining independent variables are expected to have very small or zero coefficients; under the r-m-p hypothesis, MS is expected to have a positive coefficient and the other variables zero or very small coefficients; under the e-s-x hypothesis, X-EFF is the efficiency variable with the positive coefficient and under the e-s-s hypothesis, S-EFF is the efficiency variable with the positive coefficient. However, equation (8) leaves out the second of the necessary conditions of the efficient structure hypotheses, namely, that the profit-structure relationship is spurious (efficiency is positively related to both profits and market structure variables). To test for this condition Berger estimates the following equations:

$$CONC_m = f_8 (X\text{-}EFF_i, S\text{-}EFF_i, Z_{im}{}^8) + e_i{}^8 \qquad (9)$$

$$MS_i = f_9 (X\text{-}EFF_i, S\text{-}EFF_i, Z_i{}^9) + e_i{}^9 \qquad (10)$$

Therefore, Berger's theoretical framework is described by equations (8), (9) and (10). The X-efficiency and scale efficiency variables are calculated by estimating standard translog cost functions using the stochastic cost frontier approach with five outputs and two input prices. This methodology will be discussed in more detail in Chapter 7, where we calculate our own efficiency measures.

Berger's sample consists of 4,800 banks operating between 1980 and 1989 in all three U.S regulatory environments: unit branching states, limited branching states and statewide branching states. Furthermore, local market areas need to be defined in order to calculate market structure variables. The author defines banking markets following existing definitions that separate them in Metropolitan Statistical Areas (MSA) counties and non-MSA counties and the concentration ratio used is the Herfindahl index. The control variables used in the estimation of equations (8), (9) and (10) include dummies accounting for the state in which the bank operates (there are three different regulatory regimes), dummies to distinguish between banks operating in Metropolitan Statistical Areas and banks that do not and variables accounting for real growth rates in each banks' average weighted market.

The reported empirical findings provide some support for the X-efficiency hypothesis. More specifically, X-efficiency measures are consistently found to be associated with higher bank profits, but X-efficiency does not appear to be positively related to either concentration or market shares so that it may explain higher bank profits. Some partial support is also provided in relation to the relative market power hypothesis; market share is found to be positively related to bank profits in most cases even after controlling for the effects of concentration and efficiency.

As regards the two remaining hypotheses, the structure-conduct-performance and the scale efficiency hypothesis, the results fail to show any support; scale efficiency measures are not positively related to either profits or market concentration suggesting that this theory does not explain the relationship between bank profits and market structure; furthermore, in relation to s-c-p, concentration is usually found to be negatively related to profitability (after controlling for the other effects in the equation). Given this evidence Berger concludes:

" Despite the limited support for two of the hypotheses, it does not appear that any of the efficient structure or market power hypotheses are of great importance in explaining bank profits. The efficiency and market power variables explain relatively little of the variance of profitability (median R^2 below 10 percent), and the coefficients of the profitability equations suggest that very large increases in efficiency and market share would be needed to raise expected profits significantly. Such increases could be achieved by merger, but only in a limited set of circumstances. In the best case scenario, the acquiring firm would be considerably more X-efficient than the acquired firm, and would raise the efficiency of the acquired portion of the consolidated firm much of the way toward its own level " (p. 429).

4.9 Conclusion.

This chapter has presented a detailed literature review of the application of the s-c-p paradigm in banking markets (primarily in the U.S.A). The findings reported in these empirical studies are conflicting (indicating negative as well as positive relationships) and do not permit us to draw definitive conclusions about the effect of concentration levels on banking performance. A plausible explanation for the poor findings reported in some studies might be the fact that empirical investigations of this sort rely on banking statistics data that may not always be accurate and the methodologies employed by many authors have been shown to suffer from serious defects and limitations. The results significantly improve when better quality data and more accurate methodologies are employed.

Following a number of studies (Demsetz 1973, Ravenscraft 1983, Smirlock 1985, Evanoff and Fortier 1988) that showed that differential efficiency rather than concentration affects profitability, Berger (1995) tested the efficiency hypothesis by incorporating measures of bank efficiency directly into the traditional s-c-p model (these efficiency measures were distinguished between X-efficiency (X-efficiency version of the efficiency hypothesis) and scale-efficiency (scale-efficiency version) and were calculated by estimating standard translog cost functions using the stochastic cost frontier approach. Berger's empirical findings provided some support for the X-efficiency hypothesis but no support at all for the scale-efficiency hypothesis).

As far as we are aware, this type of analysis has not been undertaken for individual European banking markets. More research on this area is required in an effort to determine the nature of the relationship between concentration and banking characteristics such as banking prices, interest rates and banking costs. Once this relationship is established and the effect of changes in concentration on banking characteristics is measured, one may be able to draw more accurate conclusions regarding the likely consequences of the creation of the Single European Market on the banking sectors of different European countries. The following chapters will attempt to do exactly that.

CHAPTER 5.

MARKET STRUCTURE AND PERFORMANCE IN EUROPEAN BANKING.

5.1. Introduction.

This chapter investigates the relationship between market structure and banking performance. In particular, we evaluate whether changes in market structure affect the profitability or prices (interest rates paid on deposits and charged on loans) of banking firms. Studies on the structure-conduct-performance (s-c-p) paradigm, apply the widely used economic principle, that the degree of competition among firms in a market is influenced by the degree of concentration in that market. Markets that are dominated by a few large firms are less competitive than markets where the number of players is great, since effective collusion becomes much more difficult. Consequently, the traditional s-c-p paradigm points that firms in less competitive environments charge higher prices and reap monopolistic profits. This framework has been widely applied to various industries and the previous chapter surveyed the empirical evidence of this relationship for the banking industry. Section 5.2 presents the theoretical framework and model specification that relates various bank market shares with bank profitability and net interest income margins, section 5.3 describes the data sample to be used in the empirical analysis. Sections 5.4 and 5.5 show the results of our empirical estimation of the model presented in section 5.2 for each national market separately (W. Germany, France, U.K) and for a pooled cross-country sample consisting all 169 banks from the three countries under study. Finally, the last section provides some concluding remarks.

5.2 The theoretical framework.

5.2.1 T. Hannan's s-c-p model.

In the previous chapter we surveyed many empirical studies that sought to estimate the relationship between market structure and aspects of bank performance. However, without exception, these studies have not been based on an explicit model of the banking firm. This section employs such a model to derive formally the most commonly tested relationships in this literature, following Hannan's (1991)[1] work. This model's main distinction from the traditional s-c-p paradigm lies in the association of bank performance measures with numerous market shares in various asset and liability categories that banks participate in, rather than one market share or concentration ratio as predicted by the s-c-p model.

Hannan employs a neoclassical portfolio choice model of asset allocation (originally developed by Klein (1971)), since these models directly tackle questions of market structure and bank behaviour. The banking firm is assumed to maximise expected utility which is a linear function of the rate of return on equity. The bank has two primary sources of funds; the equity originally invested in the firm and funds deposited from individual investors. These funds in turn are allocated among $n(=3)$ categories of assets (cash, government securities and loans). The bank is assumed to be facing a loan demand curve that is a function of the rate of interest and a number of exogenous variables that influence the state of loan demand confronted by a particular bank. The bank offers two types of deposits, demand and time deposits. The total volume of these deposits is increasing with the explicit and/or implicit rate of interest that the bank offers on these accounts.

The solution of such a model implies that a banking firm will hold a particular amount of cash until the marginal implicit return (from holding that particular amount of cash[2]) is equal to the expected return on government securities. Furthermore, the bank will

[1]. T. Hannan, " Foundations of the Structure-Conduct-Performance Paradigm in Banking", Journal of Money, Credit and Banking, Vol. 23 (Feb. 1991), p.p 68-84.

[2]. The implicit return of holding cash is calculated on the basis that an increase in the amount of cash held by a bank reduces the probability of a cash deficiency situation occuring and therefore reduces the expected losses that would result should such a situation arise.

continue to invest in government securities up to the point, where the expected return on government securities is equal to the marginal return on loans. As far as bank deposits are concerned, interest rates offered for these deposits depend upon the profitability of bank lending and the parameters of the deposit supply functions. It is suggested by the author that these parameters are not constant across regions for two reasons; firstly because of variations in per capita incomes and secondly because of variations in market structure and banking competition.

Consequently, external economic and market structure variables play a crucial role in explaining asset selection preferences cross-sectionally, a question that traditional portfolio theory is keen to avoid. Moreover, this hypothesis could easily be extended to incorporate the liability side of the banking balance sheet.

Following Hannan, we will assume that a typical banking firm collects funds through *m* different types of deposits and uses these funds plus capital to buy securities and issue *n* different types of loans. Furthermore, we will assume that banking costs can be separated by asset and liability categories, thus permitting a bank's profit equation to be expressed as

$$\pi - \sum_{n}(r_L{}^n - c_L{}^n)L_n + (r_S - c_S)S - \sum_{m}(r_D{}^m + c_D{}^m)D_m - C_f \qquad (1)$$

where r_L and c_L are the interest rates and costs associated with n categories of loans L; r_D, c_D and D_m represent the same concepts with the m categories of deposits D; r_s, c_s and S are the same concepts for the securities S and C_f is the bank's fixed cost. Equation (1) defines banking profits as a summation of net interest incomes associated with a bank's asset and liability categories.

The banking firm is assumed to be a price taker in the securities market, and a price setter to a certain extent in the loan and deposit markets (in accordance with Klein). The markets relevant to each type of loan and deposit can differ from each other, because there may prevail different structural environments with different degrees of competition. Hence, loans and deposits coming from different structural environments are in fact new types of loans and deposits and are likely to be priced differently (in terms of Klein's analysis, there are shifts in the bank's loan demand and deposit supply functions).

Then, the banking firm will be a maximiser of equation (1), subject to the constraint that assets equal liabilities plus capital

$$\sum_n L_n + S = (1-\rho) \sum_m D_m + K \qquad (2)$$

where K represents the bank's capital and ρ is the reserve ratio (assumed to apply to all categories of deposits).

By substituting equation (2) into (1) we get:

$$\pi \quad \sum_n [r_L^n - r_S - (c_L^n - c_S)]\ L_n(r_L^n, \tilde{r}_L^n) + \sum_m [(r_S - c_S)(1-\rho) - c_D^m -$$

$$r_D^m]\ D_m(r_D^m, \tilde{r}_D^n) + (r_S - c_S)K - C_f \qquad (3)$$

where $\tilde{r}_L^n$ and $\tilde{r}_D^n$ represent interest rates that are offered by the bank's competitors.

Since all interest rates are affected by market structure characteristics (including those offered by one's competitors), the banking profit function may be expressed in relation with market concentration as follows:

$$\pi = \sum_n \pi_L^n\ (CR_L^n) + \sum_m \pi_D^m\ (CR_D^m) + (r_S - c_S)K - C_f \qquad (4)$$

where π_L^n and π_D^m denote the bank's profits in the n categories of loans and m categories of deposits, respectively. They are shown as functions of the market concentration in each market. Consequently, a bank's profits are a function of the structure of all the markets in which a bank participates. This implies that there are no cross-price effects among loan and deposit categories.

By differentiating equation (3) with respect to $CR_L{}^n$ we get:

$$\theta\pi_L{}^n/\theta\ CR_L{}^n = (\theta r_L{}^n/\theta CR_L{}^n)L_n(r_L{}^n, r_L{}^n) + [r_L{}^n - r_s - (c_L{}^n - c_s)]$$

$$[(\theta L_n/\theta\ r_L{}^n)(\theta r_L{}^n/\theta CR_L{}^n) + \sum_j(\theta L_n/\theta r_L{}^{nj})(\theta r_L{}^{nj}/\theta CR_L{}^n)] \qquad (5)$$

The superscript j refers to the bank's competitors. Factoring out $\theta r_L{}^n/\theta CR_L{}^n$ yields

$$\theta\pi_L{}^n/\theta CR_L{}^n \quad \{L_n(r_L{}^n, r_L{}^n) + [r_L{}^n - (r_s + c_L{}^n - c_s][(\theta L_n/\theta r_L{}^n) +$$

$$\sum_j(\theta L_n/\theta r_L{}^{nj})\delta_j{}^n]\}\ (\theta r_L{}^n/\theta CR_L{}^n) \qquad (6)$$

where $\delta_j{}^n - (\theta r_L{}^{nj}/\theta CR_L{}^n)/(\theta r_L{}^n/\theta CR_L{}^n)$ is the ratio of an incremental change in competitor j's price resulting from a change in concentration, to an incremental change in the price of the firm in question resulting from a change in concentration (conjectural variation). Adding and subtracting $\Sigma(\theta L_n/\theta r_L{}^n)a_{ij}{}^n$ (see eq. 17 and 18, p. 163) in the second brackets in equation (6) and setting $\theta\pi_L{}^n/\theta r_L{}^n$ equal to zero (implied by first order conditions) yields

$$\theta\pi_L{}^n/\theta CR_L{}^n = [r_L{}^n - (r_s + c_L{}^n - c_s][\sum_j(\theta L_n/\theta r_L{}^n)\delta_j{}^n -$$

$$\sum_j(\theta L_n/\theta r_L{}^n)a_{ij}{}^n](\theta r_L{}^n/\theta CR_L{}^n) \qquad (7)$$

Since the term in the first brackets is positive (see eq. 14 and 15, p. 162) it follows that equation (7) will be positive if

$$\sum_j(\theta L_n/\theta r_L{}^n)\delta_j{}^n > \sum_j(\theta L_n/\theta r_L{}^n)a_{ij}{}^n \tag{8}$$

and since $\theta L_n/\theta r_L{}^n>0$, then equation (8) will hold if $\delta_j{}^n>a_{ij}{}^n$. By definition $\delta_j{}^n$ can take values which are either greater or less than one and will equal one if one's competitors' prices change proportionately to a change in market concentration. If banking markets were homogenous, then all rates would be the same and δ could not be different than one. On the other hand $a_{ij}{}^n$ can take values between zero and one including these two extremes (zero in the case of Bertrand competition and one when competitors' prices change proportionately to one's prices). Hence, we cannot be sure that equation (8) will hold, but it is very likely to be true unless the a's take values very close to unity. This can very well happen, but generally we can assume that $\delta_j{}^n>a_{ij}{}^n$ and therefore $\theta\pi_L{}^n/\theta CR_L{}^n>0$ which means that banking profits (attributable to banking loan activity) will be increased as a result of an increase in market concentration.

Following the same steps, by differentiating equation (3) with respect to $CR_D{}^m$ we get:

$$\theta\pi_D{}^m/\theta CR_D{}^m - [(r_S-c_S)(1-\rho)-c_D{}^m-r_D{}^m][\Sigma(\theta D_m/\theta r_D{}^m)\delta_j{}^m -$$

$$\sum_j(\theta D_m/\theta r_D{}^m)a_{ij}{}^m](\theta r_D{}^m/\theta CR_D{}^m) \tag{9}$$

The first term of equation (9) is negative and since $\theta r_D{}^m/\theta CR_D{}^m$ is also negative, it follows that $\theta\pi_D{}^m/\theta CR_D{}^m$ will be positive if equation (8) holds. Hence, if banking profits coming from loan activities increase with concentration (in the loan market), then the profits attributable to deposit activities will increase with concentration (in the deposit market) as well. Therefore, total bank profits are a positive function of the level of concentration in every market the bank operates.

This theoretical result is very important since all empirical studies that have tried to estimate the s-c-p paradigm so far, have failed to take into account disaggregated concentration measures. Instead, they implicitly assume that one concentration measure fits all markets in which a banking firm participates with the resulting distortion reflected in the empirical estimation. In the Single European Market a bank may participate in many markets including commercial banking markets (various deposit and loan categories, involvement in the bonds and securities markets etc), insurance services markets and brokerage services market, but since our empirical investigation examines previous market structures we dot not include in the model shares of insurance and brokerage services markets.

It follows from the above model specification, that the effect of concentration on banking profits will be enhanced the greater the volume of loans and deposits the bank is handling. In other words, holding all variables constant, the effect of concentration on profits is likely to be greater for a larger than a smaller bank. Hence, empirical estimations of the causes of banking profits variability must be performed after accounting for different bank sizes, but Hannan (1991) argues that since the quantity of loans and deposits (and other bank services) are not likely to be endogenous (and therefore cannot be used directly in the estimation), one may use the return on assets variable (and/or the return on equity variable) rather than profits in estimating the s-c-p paradigm. Although, these variables are highly correlated with each other, using the former rather than the latter may bias the estimated coefficients and may lead to some inferences (this point is discussed in detail by Hannan, 1991).

Let us now recall equation 4 :

$$\pi^i = \sum_{n}^{N} \pi_L^{in}(CR_L^n) + \sum_{m}^{M} \pi_D^{im}(CR_D^m) + (r_S - c_S)K^i - C_f^i \qquad (10)$$

A bank's profits are a separable additive function of concentration measures in the loan and deposit categories, plus a function of the net security rate (r_S-c_S). It has been proven that profits will be increasing as concentration in the loan and deposit markets increases.

Now, recall equations (1) and (2):

$$\pi - \sum_{n} (r_L{}^n - c_L{}^n) L_n + (r_S - c_S) S - \sum_{m} (r_d{}^m + c_d{}^m) D_m - C_f \qquad (11)$$

$$\Sigma\ (L_n) + S - (1-r)\ S\ (D_m) + K \qquad (12)$$

All banks are assumed to maximise a profit function such as (11), subject to the constraint represented by (12), namely that assets equal liabilities plus capital. All terms are as previously defined. By substituting (12) into (11) and differentiating with respect to $r_L{}^n$ we get:

$$\theta\pi/\theta r_L{}^n - L_n + rL_n\ dL_n/dr_L{}^n - (r_S + c_L{}^n - c_S)\, dL_n/dr_L{}^n \qquad (13)$$

Equation (13) is the maximisation problem's first order condition and must equal zero. It has already been assumed that cross-price effects are non-existent or at best negligible, so that a change in the nth category of loan results in a change in demand only for that category of loan. Furthermore, it is assumed that marginal non-interest costs are constant and that there exists some degree of product differentiation. Now, let us define the elasticity of demand for a bank's nth category of loan as:

$$e_L{}^n = -(r_L{}^n/L_n)(dL_n/dr_L{}^n) > 0 \qquad (14)$$

Taking into account (14), equation (13) may be written as:

$$r_L{}^n = (r_S + c_L{}^n - c_S)\,[e_L{}^n/(e_L{}^n - 1)] \qquad (15)$$

All terms in equation (15) are beyond the control of the bank's actions, since we have assumed that marginal non-interest costs are constant (hence the bank does not control c_L or c_S). Thus, equation (15) determines the optimal level of the interest rate charged on the nth loan category, which is an increasing function of the security rate r_S, an increasing function of the marginal non-interest cost c_l^n, a decreasing function of the marginal non-interest cost c_S (alternatively r_L^n is increasing with the differential c_L^n-c_S) and decreasing in the absolute value of the elasticity of loan demand (represented by the last term in equation 15). It follows that r_L^n will be positive if the elasticity of loan demand is elastic ($e_L^n>1$), which generally should be the case. However, in a perfectly competitive market the elasticity of loan demand will approach infinity and therefore r_L^n will simply be:

$$r_L^n = r_S + c_L^n - c_S \qquad (16)$$

Let us now try to enter market structure into the model by defining a change in bank i's nth category of loans resulting from a change in the relevant interest rate as follows:

$$dL_{ni}/dr_{Li}^n \quad \theta L_{ni}/\theta r_{Li}^n + \sum_j a_{ij}^n \left(\theta L_{ni}/\theta r_{Lj}^n\right) \qquad (17)$$

where r_{Lj}^n represents the interest rate charged by competitor j and $a_{ij}^n = dr_{Lj}^n/dr_{Li}^n$. In deriving equation (17), it has been assumed that a change in bank i's activities depends on the likely competitors' reactions. According to Waterson (1984), a_i is defined in an equation of the following form:

$$a_i^n = \sum_j a_{ij}^n \left[\theta L_{in}/\theta r_{Lj}^n\right) / \left(\sum_k \theta L_{in}/\theta r_{Lk}^n\right)\right] \qquad (18)$$

By rearranging (18) and substituting into (17) we get:

$$dL_{in}/dr_{Li}{}^{n} = \theta L_{in}/\theta r_{Li}{}^{n} + a_{i}{}^{n} \ (\sum_{j} \theta L_{in}/\theta r_{Li}{}^{n}) \qquad (19)$$

By multiplying both sides of (19) by $r_{Li}{}^{n}/L_{in}$ and rearranging terms we get:

$$e_{Li}{}^{n} = (1-a_{i}{}^{n})v_{Li}{}^{n} + a_{i}{}^{n}v_{L1}{}^{n} \qquad (20)$$

where $v_{Li}{}^{n}$ represents the absolute value of the elasticity of demand for bank i's nth category of loan if competitors do not retaliate in response to bank i's actions and $v_{L1}{}^{n}$ is the absolute value of the elasticity if competitors retaliate, matching exactly bank i's price changes. Intuitively, $v_{Li}{}^{n}$ should be greater than $v_{L1}{}^{n}$, since demand is more elastic when there is a cheaper alternative product rather than when there is not. Let us now introduce market concentration into the model. We do that by assuming:

$$a_{i}{}^{n} \quad a_{i}{}^{n}(CR_{L}{}^{n}) \qquad (21)$$

$$\text{with} \quad \theta a_{i}{}^{n}/\theta CR_{L}{}^{n} \ 0 \qquad (22)$$

where $CR_{L}n$ denotes the level of concentration in the market for the nth category of loans. Taking into account equations (21) and (20), equation (15) may be rewritten as follows:

$$r_{Li}{}^{n} = (r_{s}+c_{Li}{}^{n}-c_{si})\{v_{Li}{}^{n}+a_{i}{}^{n}(CR_{L}{}^{n})[v_{L1}{}^{n}-$$

$$v_{Li}{}^{n}]\}/\{v_{Li}{}^{n}+a_{i}{}^{n}(CR_{L}{}^{n})[v_{L1}{}^{n}-v_{Li}{}^{n}]-1\} \qquad (23)$$

Equation (23), expresses the interest rate as a function of market concentration. Taking into account equation (14), the first order condition (13) may be expressed as:

$$\theta\pi_i/\theta r_{Li}{}^n = [(1-v_{Li}{}^n+a_i{}^n v_{Li}{}^n-a_i{}^n v_{L1}{}^n) + (1/r_{Li}{}^n)(r_s+c_{Li}{}^n- c_{si})(v_{Li}{}^n-a_i{}^n v_{Li}{}^n+a_i{}^n v_{L1}{}^n)]L_{in} = 0 \qquad (24)$$

Total differentiation of (24) yields:

$$\theta r_{Li}{}^n/\theta CR_L{}^n = \{[r_{Li}{}^n-(r_s+c_{Li}{}^n-c_{si})](v_{L1}{}^n- v_{Li}{}^n)(\theta a_i{}^n/\theta CR_L{}^n)(L_{ni}/r_{Li}{}^n)\}/(\theta^2 p^i/\theta r_{Li}{}^{n2})>0 \qquad (25)$$

The first term in equation (25), the one in brackets, is positive by (15). We also know from equation (22) that $\theta a_i{}^n/\theta CR_L{}^n$ is positive. Since $v_{Ll}{}^n$-$v_{Li}{}^n$ is negative, equation (25), will only be positive if $\theta^2 p^i/\theta r_{Li}{}^{n2}$ is negative, which is nothing else than the second order condition for profit maximisation, which is assumed to hold. Hence, $\theta r_{Li}{}^n/\theta CR_L{}^n \ 0$. Equation (25), predicts that the interest rate charged for a particular category of loan, is an increasing function of concentration in the corresponding loan market category.

Let us now turn our attention to deposit interest rates. Recall equations (2) and (3). By substituting (3) into (2) and differentiating with respect to $r_{di}{}^m$ yields:

$$\theta\pi^i/\theta r_{di}{}^m = -D_i{}^m-r_{di}{}^m \ dD_i{}^m/dr_{di}{}^m + [(r_s-c_{si})(1-r)- c_{di}{}^m]dD_i{}^m/dr_{di}{}^m = 0 \qquad (26)$$

where $dD_i{}^m/dr_{di}{}^m$ represents the change in $D_i{}^m$ caused by a unit change in $r_{di}{}^m$ (taking into account competitors' reactions). The elasticity of supply for bank i's mth category of deposits is defined as:

$$e_{di}{}^m = -(r_{di}{}^m/D_i{}^m)/(dD_i{}^m/dr_{di}{}^m)>0 \qquad (27)$$

Taking into account (27), equation (26) may be written as:

$$r_{di}^{m} = [(r_s - c_{si})(1-r) - c_{di}^{m}][e_{di}^{m}/e_{di}^{m}+1)] \qquad (28)$$

Equation (28) implies that the deposit rate is an increasing function of the security rate r_s, a decreasing function in the marginal cost of handling deposits and securities, c_{di}^m and c_{si} respectively, a decreasing function in the reserve requirement r and finally an increasing function in the elasticity of supply e_{di}^m.

By following exactly the same steps as earlier, we derive a relationship between market concentration and bank i's deposit rate:

$$\theta r_{di}^{m}/\theta CR_D^{m} \quad -\{[(r_s - c_{si})(1-r) - c_{di}^{m} - r_{di}^{m}](v_{d1}^{m} - v_{di}^{m})(\theta a_i^{m}/\theta CR_D^{m})(D_i^{m}/r_{di}^{m})\}/(\theta^2 p^i/\theta r_{di}^{m2}) < 0 \qquad (29)$$

where all terms in (29), are defined exactly the same way as with the loan market, but here they apply to the mth deposit market. Equation (29) is negative, since $\theta a_i^m/\theta CR_D^m$ is positive, the expression in brackets is negative by (28), the second term is also negative (the elasticity of deposit supply with full expected rival reactions is expected to be higher than the elasticity with no rival price reactions at all) and the remaining terms are positive. Hence, the relationship between deposit rates and market concentration is a negative one, meaning that deposit rates that banks are offering will be expected to fall as market concentration rises.

Let us now summarize the predictions of this theoretical model. As concentration ratios increase in banking markets, collusion among dominant banks becomes easier, and the consumers using banking services stand to lose the most, as a result of overpricing exercised by banks. Economic theory suggests that the lessening of competition leads to higher prices and higher profits, leaving the consumer worse off and the producer better off. In contrast, as market concentration decreases, competition is enhanced and this in turn causes lower prices and lower profits[3]. As far as deposit and loan markets are concerned, an increase in the market concentration ratio of a particular loan (deposit) category, is expected to lead to a rise (fall) in the corresponding interest rate.

5.2.2 Our modified model.

Following on from the Hannan (1991) model, this section of the thesis outlines the specification of the s-c-p approach that is to be used to evaluate the relationship between market structure and performance for the three banking markets under study; France, W. Germany and the U.K. Past studies have used quite a few different dependent variables including the return on assets, the return on equity, profits (before or after taxes), total income flows etc. Here, we will use the two latter variables because they have performed better in previous studies (Fraser and Rose (1976), Heggestad (1977), Rhoades (1979), Glassman and Rhoades (1980), Rhoades and Rutz (1982) etc). Hence, an estimatable model (derived from equation 10) associating market structure with bank profits may take the simple following linear form:

$$\pi \text{ or } Y \quad A\,x + B\,b + (1/TA)a_1 + MS_k\,u + MS_j\,z + e \qquad (30)$$

where π – total bank profits (before taxes as reported in balance sheet statistics) divided by total assets (or total loans, total deposits or total personnel expenses)

Y – total banking income divided by total assets or total loans etc.

A = asset variables (such as total loans, securities, total assets held by other banks etc)

B = liability variables (such as total deposits, Certificates of Deposits, total liabilities owed to other banks etc)

[3]. Although the degree of competition in a particular market is not just measured by concentration ratios, concentration ratios and recorded changes of these ratios may be considered as good indicators of the prevailing degree of competition in a particular market and are used in this study (and have been used extensively in the past by authors of industrial organisation studies).

(1/TA) = the inverse of total assets (control variable accounting for size differences between banks-the inverse is used to avoid multicollinearity problems with the total deposits and total loans variables)

MS_k banking market shares in each k asset variable market (incudes the market share of loans)

MSj – banking market shares in each j liability variable market (includes the market share of deposits)

x, b, a_1, u and z estimated coefficients

The model of equation (30) includes variables accounting for different loan demand and deposit supply functions that are faced by banks. These variables are the absolute volumes of each bank's participation in various asset and liability categories (matrices A and B). Demand and supply factors are expected to play a significant role in explaining bank profits and such factors have been used in various previous studies (see Gilbert (1984) and Rhoades (1973), (1978), (1981) for example).

Moreover, since the model of equation (30) is derived from Klein's neoclassical portfolio choice model of asset allocation, loans and deposits coming from different structural environments are considered as new types of loans and deposits (product differentiation) and are likely to be priced differently. Bank management is able to attribute costs and revenues to individual asset and liability categories and therefore, shifts in a bank's loan demand and deposit supply functions affect its profits.

The inverse of total assets variable is included to account for size effects. As we have pointed out earlier, the effect of concentration on banking profits is greater the greater the volume of loans and deposits a bank is holding. In other words, holding all variables constant, the effect of concentration on profits is likely to be greater for a larger than a smaller bank.

The remaining independent variables are the market share variables for each asset and liability category.

In the pooled cross-country sample of banks, we use an extra independent variable (dummy), namely the per capita income in the three countries under investigation. This variable accounts for demand factors in different national markets and as it is possible that demand for banking services increases as per capita income increases, the increased demand is expected to positively affect bank profits.

Moreover, as regards the relationship between market structure and interest rates a number of previous studies (such as Fraser and Rose (1972), Whitehead (1977), Harvey (1979), Rhoades (1979), McCall and Peterson (1980) and many others) have not actually used interest rates banks charge on loans and pay for deposits, because past interest rates on different categories of loans and deposits are not readily available. Instead, they use the difference between interest and interest related income from loans and money market transactions and interest and interest related expenses from deposits and money market transactions. This proxy is deflated by total assets (to account for size differences cross-sectionally) and reflects interest rate margins. It has proved to be a well behaving dependent variable related positively with market structure (see Gilbert (1984) and our literature review in Chapter 4). Because of data limitations we chose to use in this thesis a similar proxy measure for interest rate variability.

The model as it is set out in equations (25) and (29) associating market structure and interest rate variability, however, is not complete. One has to introduce other independent variables to account for forces other than market structure affecting interest rates and thus increase the explanatory power of the model. Previous empirical studies have used a wide variety of independent variables (such as market demand conditions, differences in costs among firms and markets, control variables accounting for different product characteristics etc), depending on the author's intuition (see section 4.4.1 in Chapter 4). The literature (concentrated on the American market) has also failed to take into account the effects of regulations in trying to determine factors affecting interest rates.

Do changes in regulation strengthen or weaken the structure performance relationship? It is fairly obvious that when the "rules of the game" change, the players habits, preferences and reactions will change as well. Let us consider the effect of entry regulation.

When entry regulation is controlled by a central authority and is generally restrictive, the firms already in the market will exploit the advantages of this monopolistic competition situation. When entry barriers collapse, the firms in the market will price their products and services more competitively in conjunction with the potential threat of entry. Therefore, abolishing entry barriers would weaken the structure-performance relationship.

But how do we measure the degree of entry regulation quantitatively. There is no such measure, at least to my knowledge, that has been generally accepted in the literature. Perhaps, one could construct such a measure ex post, by measuring the number of entries and exits in an industry over a period of time and then assigning these numbers some particular value and putting them into categories (for example easy, difficult, very difficult and no entry). A priori, one cannot speculate about the performance of such a measure, but it might prove worthwhile incorporating it in a s-p model. As such, we do not include an entry barrier variable in our model.

The following model, however, introduces different demand characteristics across markets. We will assume that greater levels of income lead to increasing demand for loans and increasing supply of deposits from consumers. In other words, one would expect that banks operating in high per capita income markets will charge higher prices for their services than banks operating in low per capita income markets, other things remaining equal. Hence, we incorporate into the model a per capita income variable.

The dependent variable by construction contains the account; commissions and other similar income from service transactions and commissions and other similar expenses from service transactions. Thus, the difference between the former and the latter account is included in the model as an independent variable to avoid upward bias in the estimation, resulting from cross-sectional differences in commission charges and revenues.

As pointed out earlier in this chapter, the absolute size of banks is a very important factor affecting banking prices (and consequently banking profits). It was Demsetz (1973)[4], who first suggested that a positive relationship between prices (and/or profits) and market

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4. H. Demsetz, "Industry structure, market rivalry and public policy", **The Journal of Law and Economics** (1973).

concentration stems from differential efficiency of the larger and smaller firms in different markets, rather than reflecting monopolistic competition behaviour. Banks that are able to operate more efficiently than their competitors, incur lower costs and achieve higher profits and increased market shares that may result in increased concentration. Whether, large or small firms are more efficient is an issue attracting great controversy (see Berger (1993); these issues are also discussed in Chapter 7).

By including a bank size variable (such as total deposits), we can test whether banks with a large volume of deposits (large banks) have greater net interest income margins than banks with a low volume of deposits (small banks) and, therefore determine whether the differential efficiency hypothesis holds and if it does avoid the resulting distortion in the s-c-p model.

Hence, the estimatable model testing for the relationship between market structure and bank prices is of the following form:

$$I \quad (Y/L)a + TD\ b + C\ v + MS\ a_m + e \qquad (31)$$ [5]

where I is the difference: interest and interest related income from loans and money market transactions-interest and interest related expenses (as reported in the balance sheets of banks) divided by total income

Y/L = per capita income in each bank's country of origin (France, W.Germany, U.K)

TD = total deposits

C net margin on commissions and other fee income. This will be the difference: commissions and other income from service transactions-commissions and similar expenses from service transactions (as reported in balance sheet statistics)

MS = market share variables (a bank's share of total deposits and total loans in the market)

a, b, v and a_m = estimated coefficients

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[5]. The model of equation 31 is very similar to the estimatable model linking bank profits and market structure. The only difference with equation (30), is that equation (31) includes a new independent variable C (net commission income) and only one size variable TD (total deposits) whereas equation (30) included various asset and liability categories size variables.

The per capita income variables account for different demand characteristics across markets and the expectation is that this variable will be positively correlated with our dependent variable. The total national market deposits variable also accounts for different demand conditions across national markets and the prediction is that the bigger the demand for banking services (reflected in the volume of total market deposits) the bigger banking net interest income will be. The net fee income variable is a control variable accounting for additional income elements that might influence banking interest rate margins and the market share variables are the structural market variables; our theoretical framework predicts that market shares variables will be positively correlated with interest rate margins.

5.3 The sample and data: sources and collection

The banking markets which are of particular interest to us (because of their size and importance) and thus are being explored empirically here are the British, the French and the W. German markets. At present, there are no readily available data on individual bank statistics for credit institutions operating in the above mentioned countries[6]. However, all banking institutions submit annual reports and accounts to the appropriate home supervisory authorities. These are the Bank of England in the U.K, the Banque de France in France and the Deutsche Bundesbank in W. Germany.

The Bank of England was not able to provide such information as it is prohibited to do so by the Banking Act of 1987. The Deutsche Bundesbank kindly supplied aggregated data for various categories of banks rather than individual banks for which data were not available. Lastly, the Banque de France sent us a great deal of information concerning the French Banking market but was not able to produce individual bank statistics. Moreover, we thoroughly searched the E.U Commission's databases and we found a wealth of banking statistics, but again this data was of an aggregate nature. Therefore, the only remaining source of data was the credit institutions themselves.

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[6]. IBCA databases provide detailed banking statistics data for financial institutions from around the world, but I did not have access to these sources when this research work was being carried out.

We wrote to 402 banks in the U.K, France and W. Germany (including investment banks and building societies), asking for their help. The response rate was rather overwhelming with 169 credit institutions (50 British, 43 French and 76 W. German) providing annual reports and accounts. It was not possible, however, to obtain various interest rates charged by individual banks for specific services at a particular point in time and hence we used net interest income margins (net interest income divided by total income), which was used, among others, by Fraser and Rose (1971), Vernon (1971), Whitehead (1977), Harvey (1979), Rhoades (1981) and Wall (1985) and is regarded to be a good proxy for bank interest rates.

Furthermore, we extracted information about each bank's balance sheet structure (the size of various asset and liability categories, investments etc) and by using the respective total figures for each national market taken from central bank publications (the Bank of England's Quarterly Bulletin, the Deutsche Bundesbank's Monthly Reports and the Banque de France's Statistiques Trimestrieles), we calculated each bank's market shares in various asset and liability categories.

TABLE 5.1. Variables used in the empirical estimation of market structure effects on performance characteristics.

Bank asset and	TD=total deposits, TL=total loans, TBS=total Treasury Bills
	S=total securities, BL=total Bonds, ACI=total assets held by
	other banks, LCI=total liabilities owed to other banks
	CDS=total Certificates of Deposits, DEMD=demand deposits
liability variables	TIMED=time deposits, SAVD=savings deposits, TA=total assets
Market share	STA=each bank's share of total national market assets
	STD share of total deposits, STL=share of total loans
	STBS=share of total Treasury Bills, SS=share of total securities
	SACI share of total assets held by other banks
	SLCI share of total liabilities owed to other banks
	SBL=share of total Bonds, SCDS=share of total CDs
variables	SDEMD=share of demand deposits, STIMED=share of time deposits
Bank performance	PRGROSS=total bank gross profits (before tax)
	PRNET=total bank net profits (after tax)
variables	I=total bank net interest income, Y=total banking income
Control variables	GDPL=per capita income (taking three values for each country in sample)
	TAINV=the inverse of total bank assets, E=total bank operating expenses
and	C=net commission income, R=capital depreciation(of premises and equipment)
other variables	WL=personnel expenses per employee, W=total bank personnel expenses
Concentration	FIRMA, FIRMB and FIRMC = 3, 5 and 10-firm concentration ratios
ratios	(different for French, British and W.German samples)

However, after having gathered all total figures for various banking market operations in the U.K and W. Germany for 1990, we were still missing some important totals for France. Without these, the construction of some market share variables for French banks was no longer possible and thus empirical investigation of the French market was in jeopardy. In a final effort, we wrote to the Banque de France asking for their help in finding these figures. The French authorities provided these numbers and we were able to proceed with our empirical analysis. The gathering and processing of all this information proved to be an arduous and time-consuming exercise as the final product is nothing less than a small database (37 variables, 169 observations).

Per capita income is expressed in pounds sterling and is calculated as follows: Gross Domestic Product figures for the three countries in question are taken from the International Monetary Fund's International Financial Statistics Series. Population estimates are provided in Population Trends (Autumn 1991), a publication of the Office of Population Censuses and Surveys and finally the exchange rates are taken from the Deutsche Bundesbank's Monthly Reports (1£=2.877DM and 1£=9.693 FFr at the end of 1990). Hence, the calculated per capita income for 1990 is £13,275.61 for W. Germany, £11,850.88 for France and £9,474.49 for the U.K.

The variable C (net commission income) is taken from each bank's income statements and accounts. Then, the model is estimated for each national banking market separately (cross-sectional estimation) for the year 1990.

The models outlined in equations (30) relating market structure with bank profitability and (31) relating market structure with bank prices are estimated for each national banking market separately (cross-sectional estimation) for the year 1990. We also estimated the model using a pooled cross-country sample consisting of 169 banks. All FFr and DM figures (French and W.German banks) are converted into Pounds Sterling figures using the above mentioned exchange rates.

5.4 Cross-sectional estimates.

5.4.1 Market structure and profitability.

5.4.1.1. Empirical findings.

Table 5.2 presents the results of estimating (model of equation 30) the impact of market share variables on gross profitability by using OLS. It was not possible to include all independent variables in the estimation, as assets and liabilities size variables were very highly correlated with their corresponding share variables. Hence, we only included the share variables and the size variable 1/TA (the inverse of each bank's total assets). The dependent variable is gross profits divided by total income.

Table 5.2. The effect of share variables on gross banking profitability (gross profits/ total income).

Variable name	W. Germany	France	U.K
	Estimated coefficients (t-statistics in parentheses)		
STBS	-13.151 (-2.593[c])	0.15521 (0.101)	-1.7185 (-1.072)
SS	-38.728 (-3.113[c])	-0.3164 (-0.087)	0.4562 (0.343)
SBL	-0.49079 (-0.082)	-0.8692 (-0.226)	-2.2957 (-0.721)
SACI	12.628 (2.208[b])	-3.9119 (-0.198)	-9.1286 (-0.903)
SLCI	-14.568 (-1.759[b])	3.1226 (0.174)	27.871 (0.594)
STD	2.1518 (0.178)	1.3843 (0.114)	-24.033 (-0.88)
STL	13.3 1.043	-0.0203 (-0.0015)	26.596 (1.109)
TAINV	-16365 (-0.013)	34956000 (2.319[c])	26867000 (1.588[a])
Constant	0.1878 (11.651[c])	0.0722 (1.577[a])	0.151 (2.889[c])

Notes: The superscripts a, b and c denote significant coefficients at the 10, 5 and 1 percent levels respectively. STD is each bank's share of total national market deposits, STL is the share of total loans, STBS is the share of total T-Bills, SS is the share of total securities, SBL is the share of total Bonds, SACI is the share of total assets held by other banks, SLCI is the share of total liabilities owed to other banks and TAINV is the inverse of total assets variable. R-square adjusted 0.2809 for W. German sample, 0.1826 for French sample and 0.2072 for the British sample.

The empirical findings of Table 5.2 indicate that for the W. German sample only half the independent variables are significant estimators of bank profit rates. The shares of total deposits and total loans variables fail to statistically influence banking profit rates but both variables display the correct positive signs, indicating that there exists some sort of positive association between these share variables and total profit rates but it is not strong enough to be statistically significant. The remaining share variables are all highly statistically significant (except SBL), but only one share variable (SACI) is positively affecting profit rates (gross profits total income); the variables STBS, SS and SLCI have negative signs.

These results seem to suggest that the share of total securities has a statistically significant negative relationship with profits and therefore, a 10 per cent increase in a bank's share of total securities would bring about a small 1.51 per cent decrease in its total gross profitability (the elasticity value is 0.151), which means that as concentration in bank securities holdings increases (competition is lessened), bank profitability is reduced.

This result implies that either gross profits are reduced while total bank income remains constant or total income is icreased while gross profits remain constant or gross profits are reduced and total income is increased concurrently. This negative relationship may not be considered very odd, because the item securities includes both fixed and variable interest income-yielding papers. Moreover, the variables STBS and SLCI are also found to be negatively affecting gross profit rates. The size variable TAINV (inverse of total assets) is statistically insignificant but displays the expected negative sign, which means that as a bank's total assets increase its profitability is likely to be increased.

The French and British sample results reported in Table 5.2 do not conform with our expectations. Not one share variable is found to be statistically influencing bank profit rates. Four share variables display a negative sign and three share variables display a positive sign. One of the share variables having a negative sign is the share of total loans (French sample) and the share of total deposits (British sample). The only variable that has an impact in determining the dependent variable is the size variable TAINV.

Although these results contradict our expectations, some previous studies[7] have produced evidence indicating that bank profits are indeed negatively related (or alternatively not related at all) with various market share variables and/or concentration ratios (see literature review in the previous chapter). Extensions of the s-c-p paradigm have included the risk factor (undertaken by firms) in trying to determine the relationship between structure and performance. As a bank's market shares increase, its desire to hold risky assets decreases and therefore the relationship between profits and market structure is weakened. The implicit assumption behind this extension is that profit maximisation is no longer the sole objective of bank management. However, in our theoretical framework profit maximisation is assumed to be the sole objective of banks and therefore the prevailing negative relationships seem to suggest that the impact of market structure on bank performance measures is ambiguous.

The following table (Table 5.3) presents the results of a similar estimation, where the dependent variable is net profits (gross profits minus taxes) divided by total income. This estimation is carried out in order to determine whether the imposition of tax has any significant impact in altering the relationship between market structure and profitability. The results presented in Table 5.3 are generally in line with our earlier findings. In the W. German sample, the shares of total deposits and total loans display the correct positive signs in accordance with our findings presented in Table 5.2 and moreover, the share of total deposits variable is found to be statistically significant at the 10 per cent confidence level (it was insignificant in our previous estimation). Hence, a 10 per cent increase in the share of total deposits will bring about a 6.43 per cent increase in total bank net profitability (the

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7. Fraser and Rose (1971, 1972), Ware (1972), Fraser and Alvis (1975), Mingo (1976), Whitehead (1977), Edwards (1977), Rhodes (1979), Rhodes and Rutz (1979), Hannan (1979), Rhodes and Savage (1981), Smirlock (1983), Evanoff and Fortier (1988) and Bourke (1989).

elasticity value is 0.64339). The share of total bonds variable is found to be statistically significant and positively affecting the dependent variable (it was insignificant and negative in our previous estimation), whereas all remaining variables behave in the same fashion as before (Table 5.2) with the exception of the share of total securities which fails to statistically influence total net profit rates.

Table 5.3.The impact of market share variables on net bank profit rates (net profits/total income).

Variable name	W. Germany	France	U.K
	Estimated coefficients (t-statistics in parentheses)		
STBS	-13.121 (-3.505[c])	0.0289 (0.0212)	-1.003 (-0.921)
SS	-12.276 (-1.042)	-0.2721 (-0.084)	0.3683 (0.408)
SBL	7.9055 (1.699[b])	-0.1875 (-0.054)	-1.792 (-0.83)
SACI	8.1279 (1.953[b])	-4.2899 (-0.243)	-4.793 (-0.698)
SLCI	-7.2921 (-1.212)	4.7112 (0.295)	17.822 (0.56)
STD	13.884 (1.551[a])	3.457 (0.320)	-22.393 (-1.208)
STL	9.5236 (0.977)	-3.2559 (-0.277)	23.046 (1.416[a])
TAINV	-409170 (-0.447)	22919000 (1.705[b])	18350000 (1.598[a])
Constant	0.10283 (8.606[c])	0.055 (1.349[a])	0.104 (2.93[c])

Notes: The superscripts a, b and c denote significant coefficients at the 10, 5 and 1 percent levels respectively. R-square adjusted = 0.2594 for the W.German sample, 0.1159 for the French sample and 0.2195 for the British sample.

The French and British results show that only one share variable (namely the share of total loans) is statistically significant in explaining bank profit variability and has the expected positive sign (British sample). All the remaining share variables are statistically insignificant with the majority displaying negative signs (8 negative and 6 positive signs). The size independent variable (TAINV) is found to be statistically positively associated with bank profits in both samples (in agreement with the results reported in Table 5.2).

Table 5.4 shows the results of estimating equation (30) with a new dependent variable (gross profits divided by personnel expenses), in an attempt to test for the expense-preference hypothesis. A negative relationship between market shares and gross profit rates might indicate expense-preference behaviour as banks avoid reporting higher profits (resulting from increased market shares) by spending more resources on managerial staff and, therefore, reporting higher personnel expenses. On the other hand, a positive relationship between market shares and profitability seems to counter the expense-preference hypothesis.

The empirical findings presented in Table 5.4, indicate that the dependent variable is generally influenced in the same way and by the same independent variables as the previous bank performance measures. From the 21 share variables (in all three samples) only 6 are statistically significant; 4 positively and 2 negatively affecting profits. The four statistically significant associations are observed in the W. German results and one each in the British and French results. Moreover, among the 15 remaining share variables (those that are not statistically significant), 10 variables have negative signs, whereas only 5 variables have the expected positive signs.

Therefore, these results indicate that there is some evidence supporting the expense-preference hypothesis, but in most cases the observed relationships between market shares and profitability were positive.

Table 5.4. The impact of market structure on gross profit rates (gross profits/personnel expenses).

Variable name	W. Germany Estimated	France coefficients (t-statistics in parentheses)	U.K
STBS	-390.71 (-2.251^{b})	-1.2051 (-0.012)	-6.1904 (-0.833)
SS	-893.52 (-1.831^{b})	453.49 (1.957^{b})	1.7047 (0.276)
SBL	300.05 (1.457^{a})	-211.03 (-0.855)	-17.399 (-1.18)
SACI	206.67 (1.056)	1289.4 (1.015)	-26.309 (-0.561)
SLCI	-236.14 (-0.788)	-1315 (-1.141)	780.07 (3.591^{c})
STD	629.01 (1.467^{a})	-521.26 (-0.669)	-110.11 (-0.87)
STL	-462.63 (-1.058)	546.55 (0.645)	112.66 (1.014)
TAINV	-13121000 (-0.310)	-190590000 (-0.196)	-39279000 (-0.501)
Constant	1.4201 (2.523^{c})	2.6089 (0.885)	0.955 (3.94^{c})

Notes: The superscripts a, b and c denote significant coefficients at the 10, 5 and 1 percent levels respectively. R-square adjusted = 0.2215 for the W. German sample, 0.1278 for the French sample and 0.1642 for the British sample.

This empirical evidence does not lend clear support to the contention that market structure is positively related with bank performance. We found both positive and negative statistically significant relationships between market shares and various measures of profitability. Previous empirical studies of bank market structure and performance have generally reported contradictory results indicating that market shares and/or concentration ratios statistically influence bank performance measures both positively and negatively [(Fraser and Rose (1971, 1972), Ware (1972), Fraser and Alvis (1975), Mingo (1976), Whitehead (1977), Edwards (1977), Rhodes (1979), Rhodes and Rutz (1979), Hannan (1979), Rhodes and Savage (1981), Smirlock (1983), and Bourke (1989)].

Moreover, the level of entry barriers in the banking market might play a significant role in determining the s-p relationship. D. D. Evanoff and D. L. Fortier (1988) have found that market structure influences banking profits (measured as the return on assets) positively only in markets with high entry barriers (heavily regulated U.S unit banking states in contrast to liberal statewide branching states which were considered as low entry barriers markets) and even then the impact is relatively small (in comparison with other findings). The fact that the W. German market (and the U.K and French markets as well) operate with relatively low entry barriers (in comparison to unit banking states in the USA) might explain the weak (or negative) relationship between market structure and total income.

5.4.1.2 Summary of findings.

The empirical findings presented in this section (Tables 5.2-5.4) are rather mixed and do not permit us to unequivocally support or reject the contention that market shares positively affect bank profits. We found strong evidence that supports the existence of both negative and positive relationships between market structure and profits.

As regards the W. German sample results, the share of total deposits variable is found to be strongly statistically significant and it is positively related with both net and gross bank profit rates. Our results indicate that moderate increases in a bank's share of total deposits (1 per cent) will bring about significant increases (between 0.65 and 3.64 per cent; calculated from the corresponding elasticities) in the bank's gross and net profitability. Alternatively, this means that as market share is decreased in the banking deposits market (competition is enhanced) bank profits will decline.

The other independent share variables behaved in a contradictory manner. Most of them (except one or two) were consistently statistically significant at the 5 or 1 percent levels, but they were more often negatively rather than positively related with bank profit rates.

The empirical findings of the French and British markets fail to show any strong evidence that there exists a positive relationship between market structure and bank profitability. Only one or two share variables are found to be statistically significant in some estimations, while in others no share variable seems to be statistically influencing profit rates. Furthermore, most share variables display negative signs rather than positive signs in sharp contrast with our expectations.

As we pointed out earlier, these results might be explained in a world where the maximisation of profits is not the sole objective of bank managers and, therefore, expense-preference behaviour and an increased desire to hold more risky assets might weaken the structure-performance relationship.

5.4.2 Market structure and net interest income margins.

5.4.2.1 Empirical findings.

When the model of equation (31) is estimated for each banking market separately, the per capita income and total deposit variables become obsolete and hence are not included in the estimation. Therefore, the model collapses to a fairly simple one incorporating the net commission income variable C and the market share variables STL and STD. However, in trying to extend the scope and explanatory power of our theoretical model, we also included a few more market share variables of the banks' most important activities. These variables are the market share of total securities, total T-bills, total bonds, total assets (funds and investments held by other banks) held by other credit institutions and total liabilities (funds and investments loaned to the bank) owed to other credit institutions. We also included each bank's share of total assets.

Table 5.5 presents the results of estimating equation (31) relating bank market shares with net interest income margins.

Table 5.5. The effect of market structure on W. German, French and British banks' net interest income margins (net interest income/total income) (1990).

Variable name	W. Germany	France	U.K
	Estimated (t-statistics	coefficients in parentheses)	
C	0.0026 (3.02[c])	0.0004 (0.64)	0.0009 (0.97)
STA	-175.03 (-1.67[b])	-10.05 (-0.09)	-155.44 (-1.44[a])
STD	121.37 (2.60[c])	-16.86 (-0.67)	80.29 (0.83)
STL	-12.29 (-0.404)	25.41 (0.66)	82.55 (2.34[c])
STBS	-54.58 (-4.81[c])	-0.53 (-0.09)	-2.98 (-1.20)
SS	-32.37 (-1.07)	-10.91 (-1.42[a])	6.72 (1.07)
SBL	64.57 (2.78[c])	-2.42 (-0.34)	-1.13 (-0.27)
SACI	-24.65 (-1.93[b])	33.57 (0.69)	-77.98 (-2.29[c])
SLCI	64.4 (1.62[a])	-23.82 (-0.66)	-3.31 (-0.04)
Constant	0.39 (10.86[c])	0.38 (7.29[c])	0.74 (14.05[c])

Notes: The superscripts a, b and c denote significant coefficients at the 10, 5 and 1 percent levels respectively. R-square adjusted = 0.4412 for the W. German sample, 0.1195 for the French sample and 0.205 for the British sample.

The W. German results indicate that the variables C, STD, STA, STBS, SBL, SACI and SLCI are all statistically significant, but only the variables C, STD, SBL and SLCI display positive signs. The negative signs attached to STA, STBS and SACI mean that an increase in a bank's share of total assets, total T-Bills and liabilities owed to other credit institutions, actually causes a decrease of the bank's net interest income margin. This negative relationship between STA and I appears to suggest that banks may increase their size (total assets) and their share of total national market assets by offering higher interest rates with subsequent negative effects in their net interest income margins. The variable STL has a negative sign, but is statistically insignificant.

As regards the British and French results, most share variables are statistically insignificant (12 variables out of a total of 16). As regards the three most important share variables, namely, the total assets, total deposits and total loans, the share of total assets has a negative sign in both the British and French samples, but it is statistically significant only in the British sample. The share of total loans has a positive sign in both samples, but it is statistically significant only in the British sample and the share of total deposits is statistically insignificant in both samples. Moreover, the net commission income variable has the correct positive sign, but fails to reach statistical significance in both samples. Finally, the reported adjusted R-squares range between 0.11 and 0.44, which suggests that this model explains between 11 and 44 per cent of the variability in banking net interest income margins.

5.4.2.2 Summary of findings.

The application of the model of equation (31) in the W. German banking market yields rather mixed results, which do not clearly support or reject the supposition that when a bank's shares of various banking services are increased, then the bank's net interest income margin increases as a result. As regards the three most important share variables, this is true only for the total deposits share variable, while the total assets share variable seems to be negatively affecting the dependent variable, and the total loans share variable is found to be statistically insignificant.

The empirical findings presented for the British market appear to suggest that the share of total deposits does not statistically influence net interest income margins, whereas the share of total assets and the share of total loans are both statistically significant, with the former exerting a negative influence on the dependent variable and the latter a positive one.

The empirical results of the French bank sample indicate that all three market shares (share of total assets, total deposits and total loans) are statistically insignificant.

5.5 Pooled cross-country estimates.

This section investigates the relationship between market structure and bank profits and net interest income margins in the pooled three-country sample. The next table presents our empirical findings of the estimation of equation (30) (gross profits divided by total income is the dependent variable).

Table 5.6. The effect of market structure on banks' gross profit rates (gross profits/total income).

Variable name	Estimated coefficient	T-ratio (137 DF)	Elasticity (at means)	Standard error
STL	10.553	1.3608[a]	0.635	7.7554
SS	3.0145	0.9999	0.0685	3.0147
SACI	11.373	1.5517[a]	0.55713	7.3294
SCDS	2.1438	1.5417[a]	0.0853	1.3905
SBL	-3.3514	-0.9549	-0.13716	3.5096
STBS	-0.4612	-0.4226	-0.0379	1.0913
SLCI	-11.008	-1.4183[a]	-0.5567	7.7617
STD	-10.194	-1.3174[a]	-0.4359	7.7375
TAINV	-295180	-0.26013	-0.0055	113470
GDPL	0.00010	3.6718[c]	0.92137	0.00027
Constant	-1.1519	-3.3384[c]	-8.3864	0.34504

Notes: The superscripts a and c denote significant coefficients at the 10 and 1 percent levels respectively. TAINV is the inverse of total assets and GDPL is a binary variable accounting for per capita income differences in the three countries. R-square adjusted = 0.3779.

The empirical findings presented in Table 5.6 are in line with earlier results and indicate that most of the share independent variables are statistically significant (except SS, SBL and STBS) and they are both positively and negatively correlated with gross bank profit rates. The shares of total deposits and total loans are both statistically significant (at the 10 percent level), but STD is adversely affecting the dependent variable, whereas STL has a positive sign. Thus, a 10 per cent increase in a bank's share of total loans (total deposits) would result in a 6.35 (4.35) per cent increase (decrease) in its total gross profit rates. The remaining independent share variables SACI and SCDS are found to be positive related with the dependent variable, while SLCI displays the wrong negative sign.

Finally, the inverse of the total assets size variable failed to play any role in determining the dependent variable, although it had the correct negative sign and the per capita income variable was found to be strongly statistically significant and positively related with gross profit rates (in accordance to our expectations).

These findings clearly do not conform with our expectations. These results mean that the size of a particular bank does not play any significant role in explaining banking profits variability.

The following table (Table 5.7) shows the results of estimating equation (30) after replacing the gross profit rates dependent variable with total banking income divided by total personnel expenses, in an effort to test for the validity of the expense-preference hypothesis.

The findings reported in Table 5.7 suggest that only one independent variable (STBS) is statistically significant in determining banking income rates (has a positive sign). All other independent variables are statistically insignificant; the shares of total deposits and total loans variables display a negative and positive sign. A negative relationship between market shares and gross income rates might indicate expense-preference behaviour as banks avoid reporting higher income rates (and/or profits, resulting from increased market shares) by spending more resources on managerial staff and, therefore, reporting higher personnel expenses. Therefore, there is no evidence to support the expense-preference hypothesis, since the results indicate that there is no statistically significant negative association between the dependent variable and market shares. Moreover, the per capita income independent variable only narrowly fails to reach the 10 percent significance level and displays the wrong negative sign in contradiction with earlier results; this finding means that total banking income rates are likely to be decreasing as per capita income (and therefore demand for banking services) is increasing.

Table 5.7. The effect of market structure on banks' banking income rates (total income/total personnel expenses).

Variable name	Estimated coefficient	T-ratio (137 DF)	Elasticity (at means)	Standard error
STL	915.52	0.33502	0.50831	273.7
SS	-950.02	-0.89433	-0.19938	106.23
SACI	965.25	0.3737	0.4363	258.26
SCDS	484.97	0.9898	0.1781	489.96
SBL	-410.18	-0.3316	-0.1549	123.67
STBS	1517.1	3.9453[c]	1.1523	384.53
SLCI	-1272.6	-0.4653	-0.5938	273.5
STD	-1263.8	-0.4635	-0.4987	272.6
TAINV	-62979000	-0.1575	-0.01086	39984000
GDPL	-0.01252	-1.2861*	-10.493	0.00973
Constant	158.59	1.3044[a]	10.654	121.58

Notes: The superscripts a and c denote significant coefficients at the 10 and 1 per cent levels respectively and the superscript * means that the coefficient is almost statistically significant at the 10 per cent level. R-square adjusted = 0.4334.

The next table displays the empirical results of an OLS estimation of equation (31) (associating net interest income margins with market structure), for the year 1990 for the pooled three-country sample.

The empirical results shown in Table 5.8 suggest that four market share variables (out of 9 variables used) are statistically significant in explaining the variability of banking net interest income margins. More specifically, two market share variables have the right positive sign (STL, SCDS) and two share variables (SBL, SACI) are found to be negatively influencing the dependent variable. The share of total loans is statistically significant and has a positive sign; a 10 percent increase in a bank's share of total domestic market loans would result in a 3.9 percent increase in the bank's net interest income margins (the elasticity is 0.39).

Table 5.8. The effect of market structure on banks' net interest income margins (net interest income/total income) (1990).

Variable name	Estimated coefficient	T-ratio (154 DF)	Elasticity (at means)	Standard error
C	0.00008	2.26[b]	0.053	0.00003
STL	19.88	1.48[a]	0.39	13.36
SBL	-7.87	-2.12[b]	-0.081	3.71
SS	-3.03	-1.20	-0.039	2.52
SACI	-13.16	-1.32[a]	-0.12	9.24
SCDS	6.87	2.42[c]	0.054	2.84
STBS	0.256	0.15	0.006	1.71
SLCI	10.4	1.14	0.089	9.06
GDPL	-0.0001	-5.16[c]	-3.00	0.0001
ALLTD	0.000001	1.70[b]	-0.31	0.000001
STA	-9.29	-0.87	-0.18	11.44
STD	-7.82	-0.73	-0.13	10.6
Constant	1.47	5.63[c]	3.64	0.26

Notes: The superscripts a, b and c denote significant coefficients at the 10, 5 and 1 percent levels. GDPL is a control variable accounting for per capita income differences in the three countries and ALLTD is another control variable accounting for different levels of total market deposits prevailing in the three national markets. R-square adjusted = 0.2774.

The share of total assets and the share of total deposits are both statistically insignificant and display the unexpected negative sign. The per capita income and total deposits variables (GDPL and ALLTD) are both statistically significant and per capita income is found to be negatively related with the dependent variable, whereas the size variable (total deposits) displays a positive sign which means that a bank's ability to increase its net interest income margins increases with bank size. In other words, the largest a bank is the largest its net interest income margins will tend to be, which suggests that larger banks are more efficient than smaller banks. Furthermore, the net commission income variable is found to be statistically significant at the 5 percent level and positively related with net interest income margins. The adjusted R-square is 0.2774, explaining 27.7 percent of the variability of the dependent variable.

5.6 Conclusion.

The empirical findings reported in sections 5.4.1 and 5.4.2 are rather confusing and only partly agree with our expectations, that market structure variables positively affect bank performance (including interest rate variability). The W. German banking market findings are closer to our predictions, with the British and French markets producing quite conflicting results.

More specifically, as regards the estimated effects of bank market shares on profitability, the performance of the shares of total deposits and total loans is rather mixed. They are found to be both statistically significant and insignificant (depending on the bank performance measure and the banking market sample used) and the signs attached to these variables differed from sample to sample. The share of total deposits was consistently found to be positively related with various bank performance measures in the W. German market, but it is found to be negatively correlated with all dependent variables in the French and British markets. However, in most instances it was found to be statistically insignificant.

In contrast, the share of total loans variable was found to be negatively related with many dependent variables in the W. German and British markets (with one or two exceptions), but it is found to be positively correlated with all dependent variables in the French market. However, like the share of total deposits it was found to be statistically insignificant in most cases.

Furthermore, our pooled three-country empirical findings partly contradicted our expectations with the shares of total deposits and total loans being negatively and positively associated with total profit rates, but only the former variable (STD) was found to be statistically significant. The performance of the remaining independent variables was not very good either. Only two or three independent share variables were found to be positively and negatively statistically affecting the dependent variables.

These conflicting findings do not permit us to draw definitive conclusions about the effect bank market shares exert on banking profits in general, but the picture is more clear when each national market is examined separately. Our results are in line with other previous studies of the American banking market (see Chapter 4), which failed to clearly support the contention that as market shares and/or concentration ratios increase banking profits will be increased as well.

Moreover, as regards the influence of market structure on net interest income margins the empirical results are rather mixed as well and, subsequently, we cannot draw any clear conclusions. Our empirical findings indicated that a bank's share of total assets is statistically significant (insignificant in the French sample) and negatively related with net interest income margins, which means that an increase in a bank's share of total assets brings about a decrease in the bank's net interest income margin. In other words, when banks expand (relative to their competitors) their ability to charge high prices for their services is likely to be decreased. However, the behaviour of the share of total deposits and the share of total loans variables is compatible with our expectations. These two share variables are highly statistically significant and display the correct positive signs (in some cases they were found to be insignificant).

Overall, the empirical analysis of this chapter suggests that the relationship between bank market shares and bank profitability and banking prices (net interest income margins) is rather ambiguous (some market shares positively affect bank performance while others negatively affect bank performance). The following chapter investigates the important issue of economies of scale in banking and presents our empirical analysis and evidence of the effect of economies of scale on the banking sectors of W. Germany, France and the U.K.

CHAPTER 6.

ECONOMIES OF SCALE AND SCOPE IN EUROPEAN BANKING.

6.1 Introduction.

It has been recognised that the establishment of a Single European banking market should force banking institutions to reduce average costs by exploiting economies of scale. This chapter will try to empirically evaluate whether there is evidence of scale economies in the three banking markets under investigation.

Changes in the European regulatory environment will present banks with many opportunities to grow and expand their operations (not only across states but into new markets as well such as securities and brokerage services to name but a few). These changes that are coming about in the Single Market, will undoubtedly create a new structural scene. As some credit institutions expand, others will contract because of competitive pressures and others will specialise in those services where they are more efficient. The previous chapter investigated the relationship that prevails between various market shares and bank performance measures. The results indicated that at least in certain cases, size in particular market segments may be important in generating greater bank profits. This chapter aims to further expand the investigation concerning the issues related to bank size by focusing on bank costs and in particular on scale economies.

Section 6.2 presents a literature review of economies of scale and scope studies. Sections 6.3 and 6.4 set out the theoretical framework and describe our sample and data. Section 6.5 defines the variables to be used in the empirical analysis, while section 6.6 presents our empirical results. The last section provides some concluding remarks.

6.2 Literature review.

6.2.1 Sources of economies of scale and scope.

This section considers the sources of economies of scale and scope. Why should there be economies of scale in the first place? What are the factors that cause the existence of these economies. According to Pratten (1971)[1] the forces determining economies of scale are:

a) indivisibilities

b) economies of increased dimensions

c) economies of specialisation

d) economies of massed resources

e) superior techniques or organisation of production

f) the learning effect and

g) economies through control of markets

Indivisible costs are those costs that are in part or wholly independent of scale and therefore these costs are spread over a larger quantity of output as production is expanding and hence the cost per unit is reduced. For example, capital equipment, senior management personnel, initial development and design costs and research are all classified as indivisible costs.

Economies of increased dimensions arise when it is more economical to install and operate bigger and more sophisticated capital equipment (that will produce more, better and faster) than to have smaller and older capital equipment.

Economies of specialisation can be exploited as the output of a product or service increases and hence opportunities for further specialisation increase, both for the labour force and the capital equipment. The better skilled labour force produces more productively and the capital equipment is used more efficiently.

[1]. This is a rather old work but still quite important. C. F. Pratten, **Economies of scale in manufacturing industry**, (Cambridge University Press: 1971).

Firms that are provided with ever more resources may realise a lot of economic advantages in comparison with firms that are provided from just a few resources. Very big corporations hold a comparative advantage vis a vis small firms, when exploiting economies of massed resources, by allocating more efficiently those resources and hence producing more effectively.

As greater levels of production are achieved, it may become possible to change the existing techniques for more superior ones or to better organise the whole method of production. These developments have always resulted in important cost reductions.

The learning effect or learning by doing is a very important source of economies of scale. These forces are very much related with the economies of specialisation mentioned earlier. Significant cost reductions are realised as repetition after repetition and trial after trial teaches the workers how to carry out their tasks more effectively and more skillfully. The longer one works in performing a particular function the more productive he becomes (up to a certain point).

Finally, economies of scale can arise through control of markets. Control of a market by a firm diminishes all uncertainties the firm faces and renders the firm all those advantages attributable to a monopoly situation.

In contrast to economies of scale, there exist diseconomies of scale as well. Diseconomies of scale may arise when the supply of a factor of production is fixed or when the cost of a factor increases more than proportionately as demand for that factor increases (i.e fixed labour supply in a given area, limited space and capital equipment etc). Diseconomies of scale may also be observed when a factor of production becomes less efficient as the quantity of the factor used increases.

In addition to economies of scale, there exist economies of scope as well. Economies of scope arise when it is more economical to jointly produce two or more products than to produce each one of them separately (the total costs under joint production are smaller than the sum of the costs when the products are produced separately)[2].

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[2]. One way to determine which pairs of products exhibit economies of scope is by computing cost complementarities between them, that is to find out if the marginal cost of producing one product is reduced when this product is produced jointly with another one. For example, in the banking sector it will be

It is widely accepted that economies of scale and scope in financial institutions are brought about by: a) adopting new computer and telecommunications technology, b) using specialised labour and c) accumulating information production. Despite high set-up and other installment costs new technologies and equipment will certainly reduce unit costs by carrying out more work at a greater speed. The use of specialised labour is expected to have the same effect, although renumeration will be undoubtedly higher. Last but not least, by accumulating all kinds of information and most particularly credit information, banking institutions avoid all costs of acquiring it when taking decisions in the future and when reusing it in lending credit. All costs of gathering it and reevaluating it are zero (see Walker 1978, Humphrey 1981, Dunham 1981, Metzker 1982, Flannery 1983, Long 1984, Kolari and Zardkoohi 1987).

6.2.2 Early cost studies in U.S banking.

Most of the evidence about the existence of economies of scale in banking, comes from the empirical estimation of statistical cost functions. Bank cost studies started appearing in the literature almost forty years ago. A great majority of authors have mainly concentrated their attempts on the American banking market.

Early studies (Alhadeff 1954, Schweiger and McGee 1961, Gramley 1962, Horvitz 1963), estimated the relationship between costs and output by comparing cost/output ratios for different categories of banks. Output is measured as total loans plus investments or total deposits or total assets. The unanimous conclusion is that average costs are lower for larger banks.

Alhadeff (1954) found that average bank costs declined for small institutions (up to $5 million in total assets), remained constant for medium-sized banks and decreased again for large banks (more than $275 million in total assets). Bank output was measured as total loans plus investments.

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probably cheaper to offer many different categories of loans (including mortgage credit) than having specialised institutions for particular banking services. The benefits here may be twofold: lower production costs for banks (since roughly the same level of fixed costs are attributed to more services) and possibly lower banking prices for consumers.

Schweiger and McGee (1961) and Gramley (1962) used total assets as a measure of bank output and both studies concluded that there are economies of scale in banking. Schweiger and McGee (1961) utilised 1959 banking data from 6,233 Federal Reserve member banks (both branch and unit banks). They estimated simple cost functions separately for branch and unit banks and suggested that large banks enjoy considerable cost advantages over medium and small sized banks (average bank costs decreasing as bank size is increased). The authors found that the reduction in average bank costs was very significant for institutions with total assets exceeding $200 million.

Gramley (1962) confirmed these findings by reporting a statistically significant negative relationship between bank size and average cost (larger banks were found to have significant cost advantages over smaller banks). Gramley used a sample of 270 small sized unit banks operating in the Tenth Federal Reserve District, over the period 1956 to 1959.

Others (such as Greenbaum 1967, Powers 1969, Schweitzer 1972), have used total revenue as a measure of bank output. They generally found U-shaped cost curves, suggesting that average costs were decreasing for small-sized banks and increasing for large banks. Furthermore, Greenbaum (1967) generated separate results for branch and unit banks and argued that branch banks in comparison with unit banks had lower costs in the same output categories. However, Powers (1969) presented evidence showing that branch banks had higher rather than lower costs than unit banks, but he still reported U-shaped cost curves. Greenbaum's banking data were drawn form the Fifth and Tenth Federal Reserve Districts for 1962, while Powers used Seventh Federal Reserve District banking data for the same year.

6.2.3 Multi-product cost studies in U.S banking.

A very important development in the study of banking costs, came with the studies by Benston (1965) and Bell and Murphy (1968), who used for the first time functional cost accounting data (FCA). The FCA data provided a wealth of information on the number of accounts an institution services for various categories of loans and deposits. The data even included a detailed allocation of expenses to those categories of loans and deposits. Benston and Bell and Murphy estimated cost functions for eight different categories of banking services, taking the number of accounts serviced in each category as the appropriate measure of banking output. Their cost functions were of the following form:

$$C_i = a_0 Q_i^{a_1} H_i^{a_2} P^{a_3} B^{a_4} \qquad (1)$$

where C_i operating costs for each category of banking service, i=1,...,8.

Q_i output measured as the number of accounts in every ith category of banking service

H_i output homogeneity variable for every ith category of banking service

P factor prices

B branching status dummy variable

The a_1 coefficients tell us what happens in each category of banking service separately, but they do not tell much about the overall economies or diseconomies of scale in banking.

Benston (1965) found that small economies of scale were present for all banking services (various categories of loans and deposits). His results indicated that banks with three branches or less appeared to be more cost efficient than banks with more than three branches and, therefore, Benston concluded that size was an important factor in determining efficiency. Bell and Murphy's (1968) results confirmed Benston's (1965) findings. They also found economies of scale for most bank services (such as demand deposits, business loans, mortgage loans), whereas unit banking operations seemed to have a cost advantage compared with branching operations.

Longbrake (1974), Longbrake and Haslem (1975) and Mullineaux (1975), estimate the same form of equation separately for unit banks, branch banks and institutions affiliated with bank holding companies. They find significantly different cost functions for each organisational form of banking structure. Furthermore, the basic result is that increases in the average account size result in significant decreases in average costs in banks belonging to all forms of organisation.

Koot (1978) and Wolken and Navratil (1980) estimate logarithmic cost functions using credit union industry data. They report conflicting results with Koot concluding that there exists significant diseconomies of scale, while Wolken and Navratil reach the opposite conclusion arguing that Koot's study suffers serious specifications errors that explain the derivation of considerably biased estimates.

Mullineaux (1978) estimates various scale economies measures derived from estimates of logarithmic profit functions rather than cost functions. He suggests that the magnitude of scale economies indicated by profit function estimates exceeds the magnitude derived from cost function estimates. He also argues that the potential for exploitation of economies of scale is larger for banks operating in unit banking states than for banks operating in branching banking states. Moreover, banks that are affiliated with multibank holding companies are more profitable than other banks.

Murray and White (1980) investigate the existence of economies of scale in Canadian deposit-taking financial institutions (in particular British Columbia financial institutions). They estimate a standard logarithmic cost function and find strong evidence for the existence of increasing returns to scale. Technological developments are found to influence both the position and the slope of a bank's average cost curves. Furthermore, the results indicate that economies of scale are present even when a credit union expands by opening more offices as the extra expenses are more than offset by the growth in output.

A major development in this area came with the publication of a study by Benston, Hanweck and Humphrey (1982). Benston et. al. use various indices to measure banking output such as summations over the total number of various banking services (including demand deposit accounts, time and savings deposit accounts, real estate loans, commercial and industrial loans and installment loans). They introduce a translog functional form to estimate their cost functions:

$$\ln TC = a_{TC} + a_Q \ln Q + b_{QQ} 1/2 (\ln Q)^2 + a_B \ln B + b_{BB} 1/2 (\ln B)^2$$

$$+ b_{BQ} \ln B \ln Q + a_A \ln A + b_{AA} 1/2 (\ln A)^2 + b_{AQ} \ln A \ln Q + a_H H +$$

$$+ b_{HB} H \ln B + \sum_j a_j \ln P_j + \sum_j b_{jQ} \ln P_j \ln Q + \sum_j \sum_k g_{jk} 1/2 (\ln P_j \ln P_k) \qquad (2)$$

where TC total banking costs for all deposit and loan categories

Q total bank output

B – the number of branches

A average size of deposit and loan accounts

H dummy variable accounting for affiliation with a multibank holding company

P factor prices (two inputs, labour and capital)

The authors find U-shaped cost curves for both unit and branch banks. They argue that there exists an optimum size of bank (for which costs are minimum) for institutions from ten to twenty five million dollars in deposits. Significant diseconomies of scale are found for both unit and branch banks. When interest payments are included in total costs, the diseconomies are considerably reduced but are still there.

Murray and White (1983), Gilligan, Smirlock and Marshall (1984) and Benston, Berger, Hanweck and Humphrey (1983) all use the translog functional form to test for the significance of the interaction of various categories of output on operating costs along with tests to determine the significance of economies of scale. All three studies report significant economies of scope for at least some categories of bank output (product specific economies of scope) and economies of scale over a limited range of output. Benston et. al. express serious doubts about the appropriateness of the methdology they adopted by placing great emphasis on the problems associated with using the translog functional form[3].

Gilligan and Smirlock (1984), Nelson (1985), Kim (1986), Lawrence and Shay (1986), Kolari and Zardhooki (1987), Mester (1987) and Berger, Hanweck and Humphrey (1987) present evidence on economies of scale and scope by estimating various banking cost functions.

Gilligan and Smirlock (1984) find economies of scale for small banking institutions (below one hundred million dollars in deposits) and significant diseconomies of scale for large institutions. They criticise previous findings on the non-jointness in production and they suggest that there exist significant global economies of scope.

Nelson (1985) develops a model of bank costs by including various branch variables in the bank cost function. He shows that branches do not necessarily operate at minimum average cost, although substantial economies of scale exist at the branch level. Moreover, he finds no economies from expansion by branching.

Mester (1987) investigates the cost structure of savings and loans associations. She estimates a translogarithmic cost function for Californian savings and loans and finds slight economies of scale for the smaller associations in accordance with previous studies for commercial banks. She estimates standard errors of the calculated statistics using various tests (an innovation compared with previous studies), but her findings fail to exhibit any significant global or product specific economies of scope.

Kim (1986) develops measures for product-specific economies of scale and product-specific economies of scope (suggesting that there exist two kinds of economies of scale:economies arising from overall production activity and economies arising from the production of a particular product or set of products). He finds evidence for both global and product-specific economies of scale as well as global and product-specific economies of scope.

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[3]. For a more detailed presentation see G. J. Benston, A. N. Berger, G. A. Hanweck and D. Humphrey, " Economies of scale and Scope", *Proceedings of a Conference on Bank Structure and Competition*, Chicago, Federal reserve Bank of Chicago, 1983.

The last three studies of this group namely Lawrence and Shay (1986), Berger et. al. (1987) and Kolari and Zardhooki (1987) report no significant economies of scope at all, although their findings suggest that there exist several cost complementarities between pairs of products. With the exception of Berger et. al. (who find supporting evidence for the existence of economies of scale at small banking institutions), the others conclude that there are no significant economies of scale either for small or large banks.

Hunter and Timme (1986), concentrate on the impact of technical change on scale economies. Their model is based on the familiar translog cost function. The results indicate that bank production processes are fertile ground for technical changes (the result of technical change over time is to shift downwards the total cost/output curve). However, banks with more offices do not exploit technical changes as much as, and as well as banks with a few offices. Technological developments increase economies of scale in banking, although it is very important for a bank to be a large one to fully exploit these scale economies.

Clark (1984), Kilbride, McDonald and Miller (1986) and Lawrence (1989) develop generalized functional forms of the cost function in which all variables are transformed using a Box-Cox transformation parameter[4]. These studies generally confirm the findings of earlier works and suggest that there exist slight economies of scale for small sized banks. Kilbride et. al., in contrast with Clark, found that the functional form transformation was significant, producing significantly different estimated output elasticities. Lawrence, however, is driven by his data to reject the Box-Cox transformation altogether.

Rangan, Grabowski, Aly and Pasurka (1988, 1990), use a non-parametric frontier approach to measure the technical, scale and allocative efficiencies of U.S banks. They conclude that the banks in their sample could have produced the same level of output with only seventy per cent of the inputs used. Furthermore, most of this inefficiency is pure technical inefficiency (wasting resources) rather than scale inefficiency (operating at decreasing returns to scale) and allocative inefficiency (misallocation of resources). Their

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[4]. See G. E. P. Box and D. R. Cox, " An Analysis of Transformations", *Journal of the Royal Statistical Society* (1964), p.p 211-243.

1990 study fully confirms these findings for a much larger sample of independent banks. Berger and Humphrey (1991) duplicate these results, too. They measure inefficiencies against what they call a "thick frontier" cost function[5] approach and they find that most inefficiencies come from the overuse of labour and capital inputs (technical inefficiencies).

Finally, the most recent studies published in the last few years are: Noulas, Ray and Miller (1990), Hunter, Timme and Yang (1990), Dowling and Philippatos (1990), Shaffer and David (1991) and Gropper (1991). These later studies do not differ much in the methodology they used or the conclusions they reached than earlier studies. However, Noulas et.al. (1990) and Gropper's (1991) conclusions contradict traditional findings. Noulas et.al. report significant economies of scale (although not large in magnitude) for large banks with assets between one and three billion dollars. Larger banks (with assets greater than three billion dollars) exhibit slight diseconomies of scale. Hence, they conclude that liberalisation will not and should not lead to the emergence of a few large megabanks dominating the market.

Gropper (1991) estimates a standard translog cost function over the period 1979-1986. His results are distinctly different for two time periods. For the years up to 1982 he does not find any substantial evidence showing economies of scale beyond small levels of output. When, however, later years (1983-1986) are investigated, statistically significant economies of scale are found for banks with total assets up to five hundred million dollars. Furthermore, the degree of scale economies also increased over the whole time period. The author argues that these results may have come about because of the regulatory and technological changes that occured in the American banking market in the early 1980's and gave larger banking institutions a cost advantage over smaller ones. Consequently, there may be increased cost pressure for smaller institutions to become bigger (through expanding their own operations or through mergers and acquisitions) in order to enjoy the presumed advantages. This evidence gives credence to the predictions of many scholars of banking

[5]. For more about the "thick frontier" cost function see, A. N. Berger and D. B. Humphrey, " The dominance of inefficiencies over scale and product mix economies in banking", *Journal of Monetary Economics* **28** (1991), p.p 117-148.

organisation who cautioned that results of earlier studies might not hold after the application of the deregulation process and the use of new technological developments.

Shaffer and David (1991) estimate efficient bank scale to range from fifteen to thirty seven billion dollars in assets ($15-$37 billion), which is about a one thousandfold increase over previous studies as the authors themselves recognize. They explain away this huge disparity by pointing out that previous studies almost exclusively relied on Functional Cost Analysis data (which mainly includes small banks), whereas their sample consisted of the top one hundred commercial banks in America (from $2.5 billion to $120.6 billion in total assets as of June 1984).

Shaffer and David introduce into the economies of scale literature, the hedonic cost function which was developed by Spady and Friedlaender (1978)[6]. The hedonic cost function is a conventional cost function with the difference that the scale variable (total assets or total deposits or total revenue) is augmented with a vector of variables that reflect qualitative differences among banks in the sample (known as "hedonic" terms). This inclusion corrects the problem of incomplete information (banking activities or services that are not reported in the balance sheets) or lack of information about the number of accounts and transactions (due to the aggregated nature of the data).

Overall, the above studies suggest that small banks are generally characterised by significant economies of scale and scope, while there is only slight evidence to suggest that economies of scale and scope exist for large banks.

6.2.4 Economies of scale and scope studies in European banking.

Economies of scale studies based on European banking markets' data have only been appearing in the literature over the last ten years or so and consequently, their overall number is much smaller. Authors have considered both large and small European markets including, France, Italy, Spain, U.K, Finland, Ireland and Turkey, as well as, cross-country banking

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6. See R. Spady and A. Friedlaender, "Hedonic cost functions for the regulated trucking industry", *Bell Journal of Economics* **9** (1978), p.p 159-179.

samples. The results reported in these studies seem to indicate that there are economies of scale in European banking and to a lesser extent economies of scope for larger banks.

Dietsch (1988, 1993) examined the French banking market and found both weak and strong evidence of overall economies of scale. In his earlier study (1988), the author analysed a sample of 243 French banks for the year 1986, using a translog cost function. He found that the elasticity of total costs with respect to output was 0.97 indicating that economies of scale were present but rather weak. However, his findings also suggest that there exist significant partial economies of scale when product-specific bank outputs were associated with their corresponding costs. Dietsch's calculations showed that the partial elasticities of cost with respect to bank loans and deposits were 0.56 and 0.23 respectively.

Dietsch in his 1993 study extended his analysis to include both the investigation of economies of scale and economies of scope. He examined banking data for 1987 drawn from a sample of 343 French banks. In contrast to his earlier results, he found that significant overall economies of scale characterised the French banking system, whereas economies of scope do not seem to be of importance.

Martin and Sassenou (1992) in their study of the French banking system draw a somewhat different picture. They applied a CES-Quadratic cost function to 1987 banking data. Martin and Sassenou's results indicate that small French banks enjoy significant economies of scale and scope, while large banks experience substantial diseconomies of scale.

Banking studies by Cossutta et al. (1988), Baldini and Landi (1990) and Conogliani et al. (1991) investigated the Italian banking industry, while Fanjul and Maravall (1985) and Rodriguez et al. (1993) examined the Spanish banking industry.

The studies considering the Italian banking system analyse economies of scale and economies of scope both at the plant level (branch) and at the firm level (all branches). Cossutta et al. found evidence indicating the existence of economies of scale both at branch and firm levels, and economies of scope but only for larger banks. More specifically, at the branch level, economies of scale exist for all sizes of banks except for the very smallest institutions which exhibit constant returns to scale; at the firm level only the very large banks benefit from economies of scale. These findings were generally confirmed by Baldini and Landi and Conigliani, although these studies failed to find strong evidence of economies of scale at the firm level. They also did not find any evidence supporting the existence of economies of scope.

The two studies examining the Spanish banking market report conflicting results. Fanjul and Maravall (1985) argue that there exist significant economies of scale at the branch level, but at the firm level banks are characterised by constant returns to scale. However, Rodriguez et al. (1993) present evidence showing significant scale and scope economies for medium-sized banks and diseconomies of scale and scope for large banks. Fanjul and Maravall used a simple Cobb-Douglas functional form and drew 1979 banking data from 83 commercial and 54 savings banks, whereas Rodriguez applied a hybrid translog model on 1990 banking data from 64 savings banks.

Hardwick (1987a, 1987b) and Drake (1992) addressed the question of economies of scale in the British banking system by analysing the cost and production structures of building societies. Hardwick (1987a) found statistically significant economies of scale for small institutions (total assets below £280 million) and diseconomies of scale for larger institutions (total assets exceeding £1.5 billion). Hardwick (1987b) reported evidence suggesting that significant economies of scale exist for all societies with total assets below £5.5 billion, but the findings did not support the existence of economies of scope. Hardwick's sample was the same in both studies (1985 data for 97 building societies), but the methodology differed. His earlier study used a one-output translog cost function, whereas the later study examined a two-output translog cost function. Furthermore, Drake's results suggest that there exist economies of scale for institutions with assets between £120 and £500 million, but there are no economies of scope. Drake used the same methodology and his sample consisted of 76 building societies (1988 data).

Studies carried out by Kolari and Zardkoohi (1990), Glass and McKillop (1992) and Fields et al. (1993) examine the smaller banking systems of Finland, Ireland and Turkey respectively. Kolari and Zardkoohi used 1983 and 1984 banking data for Finnish cooperative and savings banks and found L-shaped average cost curves at the branch level and U-shaped cost curves at the firm level. Their findings also supported the existence of significant diseconomies of scope.

Glass and McKillop analysed Irish banking data for the period 1972-1990 by estimating a hybrid translog model. The authors estimated both overall economies of scale and product-specific economies of scale and economies of scope. Their results indicate that Irish banks are characterised by overall diseconomies of scale and diseconomies of scope over the production of two outputs. However, when product-specific economies of scale were estimated, Glass and McKillop found economies of scale for loans and diseconomies of scale for investments. The last study of this group undertaken by Fields et al. (1993) failed to report any evidence supporting the existence of economies of scale in the Turkish banking system (1986 and 1987 data).

Vennet (1993) applied a translog cost function on a sample of 2,600 E.U credit institutions (1991 data) and concluded that there is an optimal (from a cost perspective) size of bank which he estimated to be between $3 and $10 billion in total assets. Larger banks appeared to exhibit serious cost disadvantages in comparison with "optimal size" banks.

Recent studies undertaken by Lang and Welzel (1994), Sheldon and Haegler (1993) and Sheldon (1994) investigate the German and Swiss banking markets, whereas McKillop and Glass (1994) and Drake (1995) focused on the U.K building societies sector.

Lang and Welzel (1994) used a standard translog cost function methodology and found that German cooperative banks (especially the largest institutions were characterised by economies of scope. Sheldon and Haegler (1993) and Sheldon (1994) analysed the Swiss banking sector using an efficiency approach and concluded that Swiss banks with diversified product mixes were more efficient than specialised banks.

McKillop and Glass (1994) and Drake (1995) used a hybrid translog cost function with two outputs and three inputs. They grouped 89 building societies into three categories (national, regional and local) according to their asset size and number of branches and estimated scale and scope economies for each category and for the industry as a whole. McKillop and Glass's findings indicated that national and local building societies enjoyed overall scale economies, while regional societies were characterised by constant returns to scale. In relation to input-specific economies, national societies were associated with unit cost savings (resulting from the increased use of physical capital), whereas regional societies were not. Furthermore, regional and local societies exhibited cost inefficiencies in the production of mortgage and non-mortgage products. On the other hand, national societies were not associated with either efficiencies or inefficiencies in the production of the two outputs.

Finnaly, Drake (1995) respecified the translog multiproduct cost function that he used in his earlier (1992) study, by including an extra parameter to test for expense-preference behaviour in the U.K building society sector. Drake (1995) found no evidence of scale and scope economies when expense-preference behaviour was taken into account, a finding that contradicted hir earlier (1992) results. The author concluded that the lack of evidence of economies of scope, raises doubts as regards the supposed efficiency motives that caused the recent wave of diversification and conglomeration in U.K building society sector.

Overall, the above studies suggest that significant economies of scale generally exist for small and medium-sized institutions, whereas larger institutions seem to be characterised by diseconomies of scale. Furthermore, the empirical findings on economies of scope are rather contradictory and, therefore, the evidence on the existence of economies of scope is more uncertain. These results partly contradict the empirical findings reported for the American banking market that seem to indicate that significant economies of scope generally exist for small banks. Authors examining the American banking market have also found slight evidence of economies of scale and scope for large banks as well (see Hunter and Timme 1986, Shaffer 1988, Noulas et al. 1990, Mester 1992).

6.3 The theoretical framework.

Following Kolari and Zardkoohi (1987) and Noulas et al. (1990), in this thesis we will estimate a translog cost functional equation of the following form[7] to calculate scale and scope economies for the W. German, French and U.K bank samples:

$$\ln TC = \alpha_0 + \sum_{i=1}^{2} \alpha_i \ln Q_i + \sum_{i=1}^{2} \beta_i \ln P_i +$$

$$1/2 \left[\sum_{i=1}^{2} \sum_{j=1}^{2} \delta_{ij} \ln Q_i \ln Q_j + \sum_{i=1}^{2} \sum_{j=1}^{2} \gamma_{ij} \ln P_i \ln P_j \right] + \sum_{i=1}^{2} \sum_{j=1}^{2} \rho_{ij} \ln P_i \ln Q_j \qquad (3)$$

where

$\ln TC$ the natural logarithm of total costs

$\ln Q_i$ the natural logarithm of bank outputs (i.e Total loans and Total securities)

$\ln P_i$ the natural logarithm of input prices (i.e Cost of labour and Cost of capital)

α, β, γ, δ and ρ are coefficients to be estimated

Since the duality theorem requires that the cost function must be linearly homogeneous in input prices, the following restrictions have to be imposed on the parameters of the cost function in equation (3):

$$\sum_{i=1}^{2} \beta_i = 1 \; ; \qquad \sum_{i=1}^{2} \gamma_{ij} = 0 \; ; \qquad \sum_{i=1}^{2} \rho_{ij} = 0 \quad \text{for all } j \qquad (4)$$

Furthermore, the second order parameters of the cost function (3) must be symmetric, and therefore:

7. The estimation of a more detailed translog functional form like equation 2, was not possible because the data are not available (such as number of branches, average size of deposit and loan accounts etc).

$$\delta_{ij} = \delta_{ji} \quad \text{and} \quad \gamma_{ij} = \gamma_{ji} \quad \text{for all i,j} \qquad (5)$$

Measures of overall economies of scale may be obtained by differentiating equation (3) with respect to output:

$$SE - \theta \ln TC / \theta \ln Q = \sum_{i\ 1}^{2} \alpha_i + \sum_{i=1}^{2} \sum_{j=1}^{2} \delta_{ij} \ln Q_j + \sum_{i=1}^{2} \sum_{j=1}^{2} \rho_{ij} \ln P_i \qquad (6)$$

if SE < 1 we have economies of scale

if SE 1 we have constant returns to scale

if SE 1 we have diseconomies of scale

Overall economies of scale are calculated for different bank sizes by using the mean values for output and input prices for each bank size group. Furthermore, we also calculate partial economies of scale with respect to a specific output when other outputs and input prices are held constant. Partial economies of scale show each output's contribution to overall economies of scale. Partial economies of scale are obtained as follows:

$$PSEi = \theta \ln TC / \theta Qi = \alpha_i + \sum_{j=1}^{2} \delta_{ij} \ln Q_j + \sum_{i=1}^{2} \rho_{ij} \ln P_i \qquad (7)$$

Moreover, we calculate estimates of economies of scope by following Willig (1979) in considering two outputs Q_1 and Q_2 (i.e total loans and total securities) and the corresponding separate cost functions $TC(Q_1)$ and $TC(Q_2)$ and the joint cost function $TC(Q_1, Q_2)$. Then, economies of scope are given by:

$$SC = TC\,(Q_1, 0) + TC\,(0, Q_2) - TC\,(Q_1, Q_2) \ / \ TC\,(Q_1, Q_2) \qquad (8)$$

if SC > 0 we have economies of scope

if SC < 0 we have diseconomies of scope

We will estimate the translog cost functional form of equation (3) using Ordinary Least Squares.

6.4 Sample and data.

The banking data used in the empirical analysis in the thesis were extracted from annual reports and accounts kindly provided to us by 169 individual banks (50 British, 43 French and 76 W. German). Information on individual banking activities (figures for each bank's involvement in various asset and liability categories) was extracted from balance sheets for the year 1990. Appendix 5 provides a table depicting a typical balance sheet; it is National Westminster Bank's balance sheet (situation as of 31 December 1990).

We will test the model of equation (3) using the W. German, French and British bank samples and a pooled three-country sample consisting of all 169 banks.

6.5 Definition of variables.

The item total operating expenses (as reported in the banks' balance sheets) was used as a measure of total banking costs, and this measure was the only available variable that takes into account all banking operating costs. However, this measure suffers from a few important biases as Benston et. al. (1982) have recognised. Firstly, total operating expenses only include expenses incurred by the bank and not the remaining customer borne transactions expenses, thus lowering the real number of total bank costs. Secondly, capital depreciation costs which are included in total operating expenses are historical costs and do not precisely reflect capital depreciation values. Thirdly, there is also the risk that owner-managed banks are overstating their operating expenses accounts for various reasons (including the temptation to pay lower taxes).

The price of labour was defined as the average employee remuneration and it was calculated by dividing each bank's wages and salaries bill by the total number of employees. The price of capital was measured by depreciation (R) of a bank's fixed and other capital assets (as in almost all previous bank cost studies). This measure also suffers from a significant bias, namely, that capital depreciation costs are not represented acurately since these costs are historical costs.

However, our choice for measures of bank output becomes more difficult, because there is no unambiguous definition as to what exactly constitutes a bank's output (as with other service industries as well). Many authors (including Kolari and Zardkoohi (1987) and many other European studies; see section 6.2 our literature review) have used the currency volume of a bank's total loans (or alternatively the total number of a bank's loan accounts) as a measure of bank output, taking total bank deposits and labour and capital as inputs. Others have used total assets, total deposits or two output measures (such as total loans and securities), thus testing for the existence of economies of scope in addition to economies of scale.

In this thesis we adopt Sealey and Lindley's (1977) bank output definition used in their model of production in financial institutions and we use two measures of bank output, total loans and total securities.

6.6 Empirical results: Economies of scale and scope.

6.6.1 Evidence from the national samples.

Tables 6.1-6.3 show the results of an Ordinary Least Squares estimation of the ordinary translog cost function depicted in equation (3) for W. German, French and British banks. The natural logarithm of operating expenses is the dependent variable and total loans and total securities are the measures of bank output.

Table 6.1 The results of estimating the cost function of eq. (3) for W.German banks.

Variable	Coefficient	Estimates	Stand. error	T-ratio
Intercept	a_0	2.2065	0.6396	3.44^c
LnTL	a_1	0.4535	0.1766	2.56^c
LnS	a_2	0.3786	0.1451	2.60^c
LnWL	β_1	0.7139	0.2408	2.96^c
LnR	β_2	0.2862	0.0821	3.48^c
LnTL LnTL	δ_{11}	0.0132	0.0305	0.43
LnTL LnS	δ_{12}	-0.012	0.0208	-0.57
LnS LnS	δ_{22}	0.0134	0.0214	0.62
LnWL LnWL	γ_{11}	0.1752	0.0343	5.11^c
LnWL LnR	γ_{12}	-0.1752	0.0343	-5.11^c
LnR LnR	γ_{22}	0.1752	0.0343	5.11^c
LnWL LnTL	ρ_{11}	-0.1009	0.0339	-2.97^c
LnR LnTL	ρ_{21}	0.1009	0.0339	2.97^c
LnWL LnS	ρ_{12}	-0.1879	0.0169	-11.15^c
LnR LnS	ρ_{22}	0.1879	0.0169	11.15^c

Notes for Tables 6.1-6.3: TL is total loans, S is total securities, WL is the price of labour and R is the price of capital. The superscripts a, b and c denote significant coefficients at the 10, 5 and 1 percent levell respectively.

Table 6.2 The results of estimating equation (3) for French banks.

Variable	Coefficient	Estimates	Stand. error	T-ratio
Intercept	a_0	4,6773	0.2219	21.07[c]
LnTL	a_1	0.2583	0.0699	3.69[c]
LnS	a_2	0.4291	0.0552	7.77[c]
LnWL	β_1	0.5235	0.1589	3.29[c]
LnR	β_2	0.4765	0.1125	4.23[c]
LnTL LnTL	δ_{11}	0.0741	0.0165	4.49[c]
LnTL LnS	δ_{12}	-0.064	0.016	-3.98[c]
LnS LnS	δ_{22}	0.0908	0.0231	3.93[c]
LnWL LnWL	γ_{11}	0.0606	0.05	1.21
LnWL LnR	γ_{12}	-0.0606	0.05	-1.21
LnR LnR	γ_{22}	0.0606	0.05	1.21
LnWL LnTL	ρ_{11}	0.061	0.0241	2.53[c]
LnR LnTL	ρ_{21}	-0.061	0.0241	-2.53[c]
LnWL LnS	ρ_{12}	0.0018	0.0213	0.086
LnR LnS	ρ_{22}	-0.0018	0.0213	-0.086

Table 6.3 The results of estimating equation (3) for British banks.

Variable	Coefficient	Estimates	Stand. error	T-ratio
Intercept	a_0	4.1114	0.61	6.74[c]
LnTL	a_1	0.1691	0.1381	1.22
LnS	a_2	0.2774	0.1337	2.07[b]
LnWL	β_1	0.4723	0.1868	2.52[c]
LnR	β_2	0.5277	0.1235	4.27[c]
LnTL LnTL	δ_{11}	0.0319	0.042	0.76
LnTL LnS	δ_{12}	-0.0056	0.0499	-0.113
LnS LnS	δ_{22}	0.0216	0.0686	0.31
LnWL LnWL	γ_{11}	0.1444	0.13	1.11
LnWL LnR	γ_{12}	-0.1444	0.13	-1.11
LnR LnR	γ_{22}	0.1444	0.13	1.11
LnWL LnTL	ρ_{11}	0.0665	0.049	1.34[a]
LnR LnTL	ρ_{21}	-0.0665	0.049	-1.34[a]
LnWL LnS	ρ_{12}	0.0948	0.0367	2.58[c]
LnR LnS	ρ_{22}	-0.0948	0.0367	-2.58[c]

The empirical findings of Tables 6.1-6.3 indicate that the logarithms of total loans and total securities are both statistically significant (with the exception of LnTL in the British sample) and positively influence the dependent variable (as expected). The logarithms of the two input prices (LnWL and LnR) are also found to be statistically significant and display positive signs. These relationships simply suggest that total bank costs are positively affected by increases in the production of the two bank outputs (loans and securities) and by increases in the costs of the two inputs (price of labour and price of capital) used in the production of the two bank outputs

The estimated coefficients α, δ and ρ which are used to calculate partial and overall economies of scale according to equations (6) and (7) are not statistically significant in all cases. More specifically, coefficients δ_{11}, δ_{12} and δ_{22} are statistically insignificant in the W. German sample, coefficients ρ_{12} and ρ_{22} are statistically insignificant in the French sample, and coefficients α_1 and δ_{11}, δ_{12} and δ_{22} are statistically insignificant in the British sample. Therefore, the economies of scale estimates which are calculated using statistically insignificant coefficients must be interpreted with caution.

Tables 6.4-6.6 report the partial and overall scale economies estimates for W. German, French and British banks. These estimates are calculated according to equations (6) and (7), using mean values for the logarithms of the two bank outputs and the two input prices. Table 6.7 presents our estimates of economies of scope for the three separate national samples and the all-country sample.

Table 6.4. Partial and overall scale estimates for W. German banks.

Assets size (m £)	Q_1	Q_2	Overall
0-1000	0.5028	0.3398	0.8426
1000-10000	0.5087	0.3375	0.8462
10000-25000	0.4999	0.3507	0.8506
25000-50000	0.5222	0.3299	0.8521
50000<	0.505	0.3503	0.8553

Table 6.5. Partial and overall scale estimates for French banks.

Assets size	Q_1	Q_2	Overall
0-1000	0.4899	0.3167	0.8066
1000-10000	0.4369	0.4227	0.8596
10000-25000	0.4984	0.4443	0.9427
25000-50000	0.6161	0.3427	0.9588
50000<	0.6369	0.3293	0.9662

Table 6.6. Partial and overall scale estimates for British banks.

Assets size	Q_1	Q_2	Overall
0-1000	0.3304	0.3056	0.636
1000-10000	0.3797	0.3618	0.7415
10000-25000	0.4192	0.3921	0.8113
25000-50000	0.4471	0.3728	0.8199
50000<	0.4782	0.3944	0.8726

Table 6.7. Economies of scope estimates for W. German, French and British banks.

Assets size	W. Germany	France	U.K	All-country sample
0-1000	-0.9198	0.3978	-0.663	-0.5899
1000-10000	-0.9378	0.6243	-0.8262	-0.5727
10000-25000	-0.9634	0.9597	-0.8942	-0.5729
25000-50000	-0.9525	0.3681	-0.9052	-0.681
50000<	-0.9727	0.9992	-0.9376	-0.6382

The findings shown in Tables 6.4-6.6 indicate that the British banks appear to be enjoying the strongest economies of scale among the three national samples. Moreover, in relation to the British sample, small sized banks (total assets less than £1 billion) are associated with the biggest economies of scale (0.636), whereas the largest sized banks (total assets greater than £50 billion) exhibit the weakest economies of scale (0.8726). Overall economies of scale become ever weaker as bank size is increased. This is also the case in the W. German and French samples where the smallest banks enjoy the strongest economies of scale and the largest banks exhibit the weakest economies of scale. Economies of scale estimates for various sizes of W.German banks range from 0.8426 to 0.8553, whereas scale estimates for various sizes of French banks range from 0.8066 to 0.9662.

The findings presented in Table 6.7 indicate that only French banks experienced economies of scope, while W. German and British banks are characterised by diseconomies of scope. Furthermore, banks in the three-country sample are also found to be characterised by diseconomies of scope. Economies of scope estimates for various sizes of French banks range from 0.3978 to 0.9992. The economies of scope estimate of 0.3978 (smallest banks) suggests that the joint cost of producing both bank outputs accounts for only 39.78 percent of the sum of the total costs incurred in producing the two outputs separately.

These estimates also indicate that diseconomies of scope (three-country sample) are higher at the two largest size categories of banks and lower at the smallest size categories of banks. In other words, the observed diseconomies of scope are increased with bank size. This is also the case for W. German and British banks. Conversely, the figures in the French sample suggest that economies of scope are decreased as bank size is increased, that is smaller banks exhibit higher economies of scope than larger banks.

6.6.2 Evidence from the cross-country sample.

Table 6.8 presents the results of estimating the translog cost function of equation 3 for the three-country sample. Economies of scale estimates are shown in Table 6.9.

Table 6.8 The results of estimating equation (3) for the all-country sample.

Variable	Coefficient	Estimates	Stand. error	T-ratio
Intercept	a_0	3.6242	0.2681	13.51c
LnTL	a_1	0.1192	0.0709	1.68b
LnS	a_2	0.5516	0.09	6.12c
LnWL	β_1	0.6427	0.1353	4.75c
LnR	β_2	0.3573	0.0854	4.18c
LnTL LnTL	δ_{11}	0.0176	0.0172	1.02
LnTL LnS	δ_{12}	-0.0123	0.0145	-0.85
LnS LnS	δ_{22}	0.0376	0.0174	2.16b
LnWL LnWL	γ_{11}	0.1127	0.0353	3.19c
LnWL LnR	γ_{12}	-0.1127	0.0353	-3.19c
LnR LnR	γ_{22}	0.1127	0.0353	3.19c
LnWL LnTL	ρ_{11}	0.0441	0.0191	2.30b
LnR LnTL	ρ_{21}	-0.0441	0.0191	-2.30b
LnWL LnS	ρ_{12}	0.0158	0.0129	1.22
LnR LnS	ρ_{22}	-0.0158	0.0129	-1.22

Table 6.9. Partial and overall scale estimates for the sample of three countries.

Assets size (m £)	Q_1	Q_2	Overall
0-1000	0.188	0.5756	0.7636
1000-10000	0.1867	0.6562	0.8429
10000-25000	0.2176	0.6926	0.9102
25000-50000	0.2176	0.6707	0.8883
50000<	0.2142	0.7146	0.9288

The results of Table 6.8 are similar with the findings of Tables 6.1-6.3. The logarithms of the two bank outputs and the two input prices are statistically significant and positively affect the logarithm of total costs. Moreover, coefficients δ_{11}, δ_{12}, ρ_{12} and ρ_{22} are not statistically significant and therefore the overall and partial estimates of economies of scale are calculated using statistically insignificant coefficients.

The estimates shown in Table 6.9 suggest that small banks are generally associated with greater economies of scale than larger banks; the greatest economies of scale are enjoyed by the smallest sized banks and the weakest economies of scale are exhibited by the largest sized banks. The scale estimate of 0.7636 (smallest banks) suggests that banks may double their output by increasing total costs by only 76.36 percent.

6.3 Conclusion.

This chapter investigates both theoretically and empirically the important issue of economies of scale and scope in various E.U banking sectors.

The first part of this chapter presented a detailed literature survey of economies of scale studies and set out the theoretical framework for our empirical analysis. Previous empirical evidence does not overwhelmingly show that economies of scale exist in the banking sector. Almost all of the studies which were carried out in the last forty years exclusively focused on the American banking market and only a few studies have focused on the European banking market. This apparent lack of empirical results for the European banking markets is due to the fact that banking data are not readily available, whereas American researchers have access to more detailed banking statistics.

The empirical findings of these mainly U.S studies are rather mixed. These studies reported strong evidence indicating that economies of scale exist for small banking institutions and significant diseconomies of scale exist for large financial institutions. Overall, it was suggested that banks of about \$25m to \$100m in total deposits are of optimal size and hence big sized banks are not better positioned than small sized institutions.

In this chapter, we estimated a standard translog cost function but the estimated coefficients were not statistically significant in most cases and, therefore, we suggested that the calculated economies of scale estimates must be interpreted with caution.

Overall and partial economies of scale and economies of scope were measured for all bank samples. British banks enjoyed the strongest economies of scale among the three national markets and the largest banks in all samples were associated with the weakest economies of scale estimates, while the smallest banks were characterised with the strongest economies of scale. Hence, there is some evidence that smaller banks may benefit more from the exploitation of economies of scale than larger banks. Moreover, our findings also suggested that French banks exhibit substantial economies of scope, whereas W. German and British banks are associated with diseconomies of scope. Therefore, mergers between banks that increase the scale of operations and/or expand the joint production of products and services may be expected to yield cost savings and, consequently, cost considerations may be the incentive behind proposed mergers. However, public policy that aims to increase bank scale by encouraging mergers or through controlling entry cannot be justified on the basis of cost savings alone; the likely effect on concentration must not be overlooked.

Overall, the results presented in this chapter indicate that there exist significant economies of scale across a broad range of outputs in all three European banking markets, suggesting that there are cost advantages associated with greater size. This finding seems to confirm the view that European banks will now be able to benefit from economies of scale, as a result of the E.U Single European Market programme. However, these findings do not permit us to draw definitive conclusions about the existence of economies or diseconomies of scale in the banking sectors of the U. K, France and W. Germany. Although our three national market samples are representative of the banking structure in the corresponding countries, the number of banks used in the analysis is rather small. Furthermore, our empirical investigation is restricted to a cross-sectional analysis covering only one year, 1990. Empirical studies investigating a number of years and examining more national markets, should shed more light on the debate of economies of scale and their effect on the workings and the evolution of the European banking system.

The following chapter advances the analysis presented in Chapter 5 and in this chapter, by further focusing on cost efficiency and evaluating how it may influence the structure-performance relationship. We saw in Chapter 5 that market shares in certain asset and liability categories had a positive impact on bank performance, and the evidence presented in this chapter also indicated that economies of scale appear to be important in various European banking markets. The next chapter investigates another aspect of cost efficiency -X-efficiency- and incorporates this into the s-c-p framework along the lines suggested by Berger (1995). The aim is to test whether it is market share that affects bank performance measures or efficiency that has an impact on both market shares and performance measures.

CHAPTER 7.

MARKET STRUCTURE, PERFORMANCE AND EFFICIENCY IN EUROPEAN BANKING.

7.1 Introduction.

In Chapter 5 we attempted to evaluate the assertion that banks with large market shares are able to reap higher profits by exercising market power in loan and deposits markets. Moreover, as we pointed out in the literature review of Chapter 4, recent developments have suggested an efficient-structure hypothesis as well. The efficient-structure hypothesis suggests that banks that are able to operate more efficiently than their competitors, incur lower costs and achieve higher profits and increased market shares that may result in increased concentration. Therefore, according to this hypothesis, efficiency is the factor that positively influences both market shares and bank profits. This hypothesis is usually referred to as the X-efficiency hypothesis in order to distinguish it from the scale-efficiency hypothesis. The scale-efficiency hypothesis assumes that banks are equally X-efficient (the differences in the quality of management and in production technologies are negligible), but some banks simply operate at a greater efficient scale than others and therefore, these banks are assumed to enjoy higher profits and increased market shares.

The aim in this chapter will be to distinguish among the market-structure and efficient-structure hypotheses by incorporating measures of X-efficiency and scale-efficiency in the analysis. Section 7.2 presents a literature review of recent approaches to measuring X-efficiency in banking markets. Section 7.3 puts forward the different variations of the models to be tested. Section 7.4 presents our methodology, while Section 7.5 analyses our empirical results. Some concluding comments are offered in Section 7.6.

7.2 The measurement of X-efficiency in banking markets: recent attempts.

In Chapter 4, we showed how differential efficiency rather than concentration may affect bank performance measures. We discussed Berger's (1995) attempt to test for the efficiency hypothesis by incorporating measures of bank efficiency directly into the traditional s-c-p model. These efficiency measures were distinguished between X-efficiency and scale-efficiency. X-efficiency provides a measure of how effectively banks are using their inputs to produce a given level of output and covers all technical and allocative efficiencies of individual firms (that are distinct from economies of scale and scope). X-efficiency is a measure reflecting the distance between a firm's own position in relation to its "efficient" production frontier (see Evanoff and Israilevich 1991). On the other hand, scale efficiency is a measure indicating whether banks with similar production and management technology are operating at optimal economies of scale.

In this section we will briefly review the empirical studies that have estimated efficiency in banking markets. These studies examine the cost structure of banks by using two methodologies; the stochastic cost frontier approach and the Data Envelopment Analysis (DEA) approach. The stochastic cost frontier approach is the methodology used in this thesis and we will discuss it in more detail in section 7.4.

Studies that have used the stochastic cost frontier approach include Berger and Humphrey (1991), Mester (1993, 1994), Cebenoyan et al. (1993), Elyasiani and Mehdian (1990a), Altunbas et al. (1994a, 1994b, 1995), Drake and Weyman-Jones (1992), Soares de Pinho (1994) and Berger et al. (1993b) while studies that have used the DEA approach include Sherman and Gold (1985), Parkan (1987), Vassiloglou and Giolis (1990), Field (1990), Drake (1991), Elyasiani and Mehdian (1990b) and Berg et al. (1993).

Berger and Humphrey (1991) measured inefficiencies in U.S banking for 1984 using the thick frontier version of the stochastic cost frontier approach. Their results seem to suggest that there are significant inefficiencies in the banking system which are operational (stemming from overusing physical inputs) rather than scale or scope inefficiencies. The operational inefficiencies reached 20 to 25 percent compared with 4.2 to 12.7 percent for scale inefficiencies. Based on these findings, Berger and Humphrey argued that banks would face substantial presurre to cut their costs following the moves to deregulate the banking market. Alternatively, banks would have to merge with more efficient institutions or exit the market if they could not compete in an ever increasing competitive environment.

Mester (1993) employed the stochastic cost frontier approach to investigate efficiency in American mutual and stock Savings and Loans (S&L's) institutions in 1991. The empirical findings suggested that, on average, stock S&L's are less efficient (based on different measures of inefficiency) than mutual S&L's. The study also found that capital to assets ratios are positively related with efficiency in both mutual and stock S&L's and the more the S&L' rely on uninsured deposits the less efficient they are likely to be. In a similar study, Mester (1994) used the same methodology to study the efficiency of commercial U.S banks operating in the Third Federal Reserve District (parts of Pennsylvania and New Jersey, Delaware) for 1992. The author found significant X-inefficiencies ranging from 6 to 9 percent, although scale and scope inefficiencies were not observed. The X-inefficiency result means that an average bank can reduce its production costs by between 6 to 9 percent if it uses its inputs as efficiently as possible (given its particular output level and output mix).

Cebenoyan et al. (1993) estimated inefficiency scores for 559 S&L's operating in the Atlanta Federal Home Loan Bank District in 1988, also using the stochastic cost frontier methodology. Their reported results seem to indicate that stock and mutual S&L's had very similar cost structures (in contradiction to Mester's findings) and therefore operating efficiency was not related to form of ownership (stock and mutual S&L's). Moreover, the authors observed that the mean inefficiency score was 16 percent, which means that the average S&L can produce its output by using only 84 percent of the amount of inputs actually used.

In their first study Altunbas et al. (1994a) evaluated inefficiencies for the German banking market, while in their later study (1994b) examined the Italian credit cooperative banking sector. The methodology used in both studies was the stochastic cost frontier approach. Altunbas et al. (1994a) distinguished between five categories of German banks: private commercial banks, public savings banks, mutual cooperative banks, central organisations and mortgage banks. Their results indicated that the mean inefficiency score for all banks was 24 percent suggesting that German bank could produce the same output with 76 percent of their inputs if they were operating efficiently. They also found that mortgage banks and central organisations were less efficient than the other categories of banks, whereas different ownership characteristics did not seem to have a significant impact on the absolute level of bank inefficiencies in the German market.

Altunbas et al. (1994b) analysed the Italian credit cooperative banking sector between 1990 and 1992. Their findings suggested that the mean inefficiency score for 1990 was 13.1 percent, but these scores appear to be higher for 1991 and 1992. Moreover, the authors found that banks operating in the North-East Central region of Italy (Veneto and Emilia) were significantly less efficient than banks operating in the North-West and North-East border regions and in the South.

Drake and Weyman-Jones (1992) used both the DEA and stochastic cost frontier approaches to compare the efficiency of the U.K building societies. Their results of the DEA analysis showed that British building societies had a mean inefficiency score of 12.5 percent. Overall efficiency was partitioned into two components: technical efficiency and allocative efficiency and it was found that allocative efficiency accounted for most of the overall efficiency index. Drake and Weyman-Jones argued that their findings suggested that most of the inefficiency that was associated with the U.K building society sector was attributable to a less than optimal allocation of inputs rather than to the inefficient use of these inputs. Furthermore, the findings of the stochastic cost frontier analysis confirmed their DEA results and, moreover, showed that productive inefficiency scores were very low.

Altunbas et al. (1995) also examined the U.K market for 1993 by using a one output-three input stochastic cost frontier methodology to calculate inefficiency scores. Their results seem to indicate that British banks and building societies were remarkably efficient (mean inefficiency score of 6.33 percent), confirming Drake and Weyman-Jones's (1992) findings. Furthermore, Altunbas et al. also found that banks on average were more efficient than building societies.

Soares de Pinho (1994) estimated the relative efficiency of Portuguese banks between 1987 and 1991 and reported productive efficiency values ranging from 0.47 to 0.96 with an average of 0.82. The author also found that Portuguese nationalised banks were less efficient than their private counterparts and average efficiency grew about one percent each year over the period 1987-1991.

Finally, Berger et al. (1993b) used a stochastic cost frontier approach and found that larger banks were on average substantially more X-efficient than smaller banks and suggested that this finding may offset some of the diseconomies of scale that are found to be characterising larger banks in many cost studies.

Sherman and Gold's (1985) study was the first attempt to assess the efficiency of U.S savings banks by using the DEA methodology on 14 branches. The results showed that 6 of the 14 branches were operating relatively inefficiently. Sherman and Gold calculated an overall input technical inefficiency measure that reached 28 percent, which means that branches would be able to produce a wide range of products and services by employing more advanced technical methods and only 72 percent of their inputs (labour, office space and supply costs). However, this study suffers from the shortcoming which is the very small size of the sample that probably had a negative effect on the discriminatory power of the analysis.

Parkan (1987) adopted the same DEA approach in his analysis of 35 branches of a major Canadian Chartered bank, while Vassiloglou and Giolis (1990) conducted a similar exercise involving 20 branches of a large Greek bank in 1987 and Tulkens (1990) applied DEA techniques to analyse the efficiency of 773 branches of a Belgian public bank and 911 branches of a Belgian private bank. Parkan's findings suggested that 11 of the 35 branches of the Canadian bank were relatively inefficient, whereas Vassiloglou and Giolis's results indicated that 11 of the 20 branches of the Greek bank were relatively inefficient. Moreover, the empirical results reported by Tulkens (1990) revealed that only 6 percent of bank branches were efficient (when the DEA methodology was used) compared with 74.6 percent of the public bank's branches and 57.8 percent of the private bank's branches that were oparating efficiently when the Free Disposed Hull methodology (a version of the DEA technique) was used.

Rangan (1988) and Elyasiani and Mehdian (1990a) tried to break down banking inefficiencies into two distinct groups; pure technical inefficiencies and scale inefficiencies. Rangan (1988) analysed the cost structures of 215 U.S banks and found that the average measure of inefficiency (almost all of which is attributed to pure technical inefficiency) was 30 percent, which means that banking output could be produced with only 70 percent of the inputs. Elyasiani and Mehdian (1990a) used a sample of 144 U.S banks and estimated that scale inefficiencies reached a very significant value of 38.9 percent, while pure technical inefficiencies were measured at only 11.7 percent, thus attributing vital importance to scale inefficiencies in contrast to Rangan's findings.

Two other studies undertaken by Field (1990) and Drake et al. (1991) applied the DEA methodology to the building societies sector in the U.K. Field (1990) examined 71 building societies in 1981 and concluded that 61 of them were operating inefficiently primarily due to scale inefficiencies confirming Elyasiani and Mehdian's (1990a) result. Moreover, Field showed that the overall technical efficiency of banks was negatively related with bank size, in contrast to the findings of most U.S studies that seem to indicate that technical efficiency is actually positively associated with bank size. Drake et al. (1991) found that 63 percent of the building societies included in his sample were inefficient (compared with 86 percent in Field's study) and overall efficiency appeared to be positively related with bank size (contradicting Field's result).

Overall, U.S studies that used the stochastic cost frontier methodology to estimate inefficiency, have generally found average banking inefficiency to be around 20-25 percent. On the other hand, U.S studies that used the DEA methodology have reported findings ranging from around 10 percent to more than 50 percent and these findings are in line with the European stochastic cost frontier studies that generally tend to report low inefficiency scores (between 10 and 20 percent).

7.3. Specification of the models and tests.

In Chapter 5 we investigated the relationship between market structure and bank performance and we found that size in particular market segments is positively related with bank profits and net interest income margins, and therefore, bank size may be important in generating greater bank profits and bank prices. The tests we carried out in Chapter 5 may be grouped under the category "relative market power hypothesis" as suggested by Berger (1995) (see Chapter 4). The aim of this chapter is to incorporate directly into the analysis efficiency measures in order to test for the validity of the X-efficiency and scale-efficiency versions of the efficienct structure hypothesis as suggested by Berger (1995).

As we have already seen (Chapter 4), the efficient structure hypothesis (X-efficiency version, e-s-x) supposes that banks with either superior management and/or better production technologies have lower costs and therefore higher profits and as a result are assumed to gain large market shares that may result in higher concentration levels. In this case, efficiency is the driving force that causes both bank profits and concentration levels to rise. On the other hand, the efficient structure hupothesis (scale efficiency version, e-s-s) suggests that banks have equally good management personnel and technology (differences are negligible), but some banks simply produce at more efficient scales than others and therefore have lower unit costs and higher unit profits; these firms are assumed to have large market shares that may result in higher levels of concentration.

The structural model underlying Berger's efficient structure hypotheses (both e-s-s and e-s-x versions) is the following:

$$\pi_i - f_1 (EFF_i , Z_{im}{}^1) + e_{im}{}^1 \qquad (1)$$

$$MS_i = f_2 (EFF_i , Z_{im}{}^2) + e_{im}{}^2 \qquad (2)$$

$$CONC_m = f_3 (MS_i \text{ for all } i \text{ in } m) \qquad (3)$$

where π measures profitability, EFF is the efficiency measure (either X-efficiency or scale efficiency), Z represents vectors of control variables, MS is market share and CONC is concentration, the e's are random errors, m indexes the market and i indexes the banks in each market.

This model predicts a positive profit-structure relationship as a spurious outcome because both profits and structure are affected by efficiency. In equation (1), bank profits are assumed to be determined by cost differences originating from X-efficiency or scale efficiency (depending on which version is tested). In equation (2), it is hypothesised that efficiency is positively related with market structure: more efficient banks are presumed to have greater market shares. In equation (3) market share is positively related to concentration (most widely used measure of concentration is the Herfindahl index). Consequently, what this model essentially supposes is that more efficient banks have higher profits and higher market shares at the same time (eq. 1 and 2) and that the higher the market share the higher concentration will be.

Many previous studies (see Smirlock 1985, Evanoff and Fortier 1988) estimated an equation of the following form:

$$\pi = f (CONC, MS, Z) + e \qquad (4)$$

where the coefficients of concentration and market share are tested for equality to zero. The common finding is that the market share is usually positive and statistically significant and the concentration coefficient is usually small and statistically insignificant. Both Smirlock (1985) and Evanoff and Fortier (1988) suggested that once the market share for individual banks is controlled for, concentration provides no additional explanatory power in influencing bank profit variability. It may be argued that these findings support three of the original four hypotheses put forward by Berger (1995); the relative market power (r-m-p) hypothesis and the two versions of the efficient structure hypotheses. In relation to the r-m-p hypothesis, it has been assumed that the concentration coefficient is insignificant because profitability and concentration are only spuriously related since both variables are correlated with market share.

As regards the two efficient structure hypotheses (e-s-x and e-s-s), profitability and concentration are only related because both are influenced by the relevant efficiency variable. The profitability-concentration relationship disappears when market share is directly accounted for, since concentration is only influenced by efficiency because market share is influenced by efficiency. Smirlock et al. (1984) interpret the market share coefficient as evidence of the existence of X-inefficiencies (e-s-x hypothesis), while Gale and Branch (1982) suggest that it reflects the effects of scale efficiencies (e-s-s hypothesis). Therefore, equation (4) cannot distinguish among three different hypotheses. In an attempt to resolve this problem, we follow Berger (1995) in selecting a reduced form equation that includes both direct measures of efficiency and nests the four hypotheses and is of the following form:

$$\pi_i = f_4 (CONC_m, MS_i, X\text{-}EFF_i, S\text{-}EFF_i, Z_{im}{}^4) + e_i{}^4 \qquad (5)$$

Under the s-c-p hypothesis, CONC has a positive coefficient and the remaining independent variables have insignificant coefficients; under the r-m-p hypothesis, MS has a positive coefficient and the other variables are statistically insignificant; under the e-s-x hypothesis, X-EFF is the efficiency variable with the positive statistically significant coefficient and under the e-s-s hypothesis, S-EFF is the efficiency variable with the positive statistically significant coefficient. However, equation (5) ommits the second of the necessary conditions of the efficient structure hypotheses, namely, that the profit-structure relationship is spurious (efficiency is positively related to both profits and market structure variables). To test for this condition we follow Berger (1995) in estimating the following equations:

$$CONC_m = f_5 (\text{X-EFF}_i, \text{S-EFF}_i, Z_{im}{}^5) + e_i{}^5 \qquad (6)$$

$$MS_i \quad f_6 (\text{X-EFF}_i, \text{S-EFF}_i, Z_i{}^6) + e_i{}^6 \qquad (7)$$

Therefore, our theoretical framework is described by equations (5), (6) and (7). The X-efficiency and scale efficiency scores for individual banks are calculated by estimating a standard translog cost function using the stochastic cost frontier approach with two outputs and two input prices. These scores are used in the X-Eff and S-Eff variables. This methodology is discussed in the following section.

7.4. The methodology: the stochastic cost frontier approach.

The stochastic cost frontier approach is used in this thesis to calculate inefficiency scores for all the banks included in our sample. The stochastic cost frontier approach assumes that a firm's observed cost deviates from the cost frontier because of a random error and possible inefficiency. The cost function that will be estimated is the standard translog cost function (the function that was discussed in Chapter 6). The translog cost function is specified as follows:

$$\ln TC = \alpha_0 + \sum_{i=1}^{2} \alpha_i \ln Q_i + \sum_{i=1}^{2} \beta_i \ln P_i + 1/2 \left[\sum_{i=1}^{2}\sum_{j=1}^{2} \delta_{ij} \ln Q_i \ln Q_j + \sum_{i=1}^{2}\sum_{j=1}^{2} \gamma_{ij} \ln P_i \ln P_j \right]$$

$$+ \sum_{i=1}^{2}\sum_{j=1}^{2} \rho_{ij} \ln P_i \ln Q_j + \varepsilon \qquad (8)$$

where

TC total costs, comprising operating costs and financial costs (interest paid on deposits)

Q_1 – total loans

Q_2 total securities

P_1 = average annual wage expenses per employee

P_2 average price of capital, calculated as the ratio of total depreciation expenses to total fixed assets

ε stochastic error term

α, β, γ, δ and ρ are coefficients to be estimated

Since the duality theorem requires that the cost function must be linearly homogenous in input prices, the following restrictions are imposed on the parameters of equation (8):

$$\sum_{i=1}^{2} \beta_i = 1 \; ; \quad \sum_{i=1}^{2} \gamma_{ij} = 0 \; ; \quad \sum_{i=1}^{2} \rho_{ij} = 0 \text{ for all } j \qquad (9)$$

Futhermore, the second order parameters of the cost function in equation (8) must be symmetric:

$$\delta_{ij} = \delta_{ji} \quad \text{and} \quad \gamma_{ij} = \gamma_{ji} \qquad \text{for all } i, j \qquad (10)$$

Using Shephard's Lemma, the cost share of each input, X_i, can be obtained by partially differentiating the cost function with respect to the input prices, P_i (Christensen, Jorgenson and Lau, 1973). This implies:

$$S_i - \theta \ln TC / \theta \ln P_i = (\theta TC / \theta P_i)(P_i / TC) = P_i X_i / TC \quad 1 < i < n \quad (11)$$

where S_i is the share of the ith input in the total cost. Thus, the cost share equations are as follows:

$$\Sigma_{i\,j\,1}^{2} \quad \beta_i + \Sigma_{j\,1}^{2} \gamma_{ij} \ln P_j + \Sigma\, \rho_{ij} \ln Q_j + \varepsilon_i \qquad (12)$$

where ε_i is the stochastic error for the i'th share equation. Following Aigner et al. (1977), we assume that the error of the cost function is:

$$\varepsilon - u + v \qquad (13)$$

where u and v are independently distributed. u is usually assumed to be distributed as half-normal, that is, a one-sided positive disturbance capturing the effects of inefficiency, and v is assumed to be distributed as two-sided normal with zero mean and variance σ, capturing the effects of the statistical noise. Furthermore, given the distributional assumptions for the error terms u and v, the denstity function of the composite error term ε can be written as:

$$g(\varepsilon) = 2/\sigma \; f(\varepsilon/\sigma) \; [1\text{-}F(\varepsilon\lambda)] \qquad (14)$$

where $\sigma = (\sigma_u + \sigma_v)^{1/2}$, $\lambda = \sigma_u / \sigma_v$, f(.) and F(.) are the standard normal density and the distribution functions for a standard normal random variable, respectively The log-likelihood function can be shown as:.

$$\ln L \quad (N/2) \ln(2/\pi) - N \ln\sigma + \sum_{i=1}^{N} \ln [\, 1\text{-}F\,(\varepsilon_i \lambda\sigma)^{-1}] - (1/2\sigma^2) \sum_{i=1}^{N} \varepsilon_i^2 \qquad (15)$$

where N is the number of firms. Jondrow et al. (1982) have shown that the ratio of the variability (standard deviation, σ) for u and v can be used to measure a bank's relative inefficiency. Estimates of this model can be computed by maximising the likelihood function directly (see Olson, Schmidt and Waldman 1980).

Once the model of equation (15) is estimated, inefficiency measures are calculated using the residuals. Firm-specific estimates of inefficiency, u, can be calculated by using the distribution of the inefficiency term conditional on the estimate of the composed error term, as proposed by Jondrow et al. (1982). The mean of this conditional distribution for the half-normal model is shown as:

$$E\,(u_i / \varepsilon_i) = (\sigma\lambda / 1 + \lambda^2) \;\; \{[\, f\,(\varepsilon_i \, \lambda / \sigma) / 1 - F\,(\varepsilon_i \, \lambda / \sigma)] + (\varepsilon_i \, \lambda / \sigma)\} \quad (16)$$

where E (u / ε) is an unbiased and consistent estimator of u, since regardless of N, the variance of the estimator remains nonzero (see Greene 1993). Allen and Rai (1993), Yuengert (1993) and Mester (1993) use the half-normal specification to test for inefficiency differences between financial institutions mainly in the U.S market.

Stevenson (1980), however, has analysed the case in which u, has a truncated normal distribution with parameters μ, which is allowed to differ from zero in either direction, and variance σ. Greene (1990) has shown that the mean of the conditional distribution for the truncated normal model can be obtained by replacing $\varepsilon_\iota \lambda\sigma$ in equation (16) with

$$\mu^* \quad (\varepsilon_\iota \lambda / \sigma) + \mu / \sigma\lambda \qquad (17)$$

where μ is the mean of the non-truncated distribution. In this thesis we have used the truncated half-normal distribution model to calculate inefficiency scores because this model provided the best fit for our sample.

Following Mester (1987b) and Noulas et al. (1990), we estimate overall economies of scale by calculating the elasticity of cost with respect to output, holding the product mix and non-output variables constant. A measure of overall economies of scale is given by the following cost elasticity, obtained by differentiating equation (8) with respect to output:

$$SE - \sum_{i=1}^{2} \alpha_i + \sum_{i=1}^{2}\sum_{j=1}^{2} \delta_{ij} \ln Q_j + \sum_{i=1}^{2}\sum_{j=1}^{2} \rho_{ij} \ln P_i \qquad (18)$$

if $SE < 1$ we have increasing returns to scale, which implies economies of scale

if $SE - 1$ we have constant returns to scale and

if $SE > 1$ we have decreasing returns to scale, which implies diseconomies of scale

Scale economies estimates can also be derived for various bank sizes by calculating equation (18) using different mean values for output and input prices for each bank group. Firm-specific scale economies estimates are obtained by using firm-specific output and input prices. These scale economies scores and the inefficiency scores obtained by calculating equation (16) are used in the estimation of our framework of equations (5), (6) and (7).

7.5 Empirical results.

7.5.1 X-efficiency and scale-efficiency scores.

The banking data for 1990 used in the empirical analysis were extracted from annual reports and accounts provided to us by 169 individual banks (50 British, 43 French and 76 W. German). Information on individual banking activities (figures for each bank's involvement in various asset and liability categories) was extracted from balance sheets. Section 5.3 in Chapter 5 describes the data sample in more detail.

Tables 7.1-7.4 show some descriptive statistics of X-inefficiency scores for the pooled three country sample and for each national banking market separately, while Table 7.5 presents scale efficiency scores (means) according to bank size and country. Firm-specific X-inefficiency and scale efficiency estimates for all banks in our sample along with the translog cost frontier parameter estimates are provided in Appendix 3[1].

The figures reported in Tables 7.1-7.4 indicate that amongst the three national banking markets under investigation, French banks were the least efficient (mean 0.2452) and British banks were the most efficient (mean 0.2081) with W. German banks in the middle (mean 0.2229). The mean inefficiency score of 24.52 percent reported for French banks in 1990 means that they could produce the same output with only 76.48 percent of the

[1]. These scale efficiency scores are very similar with the scale economies estimates calculated in Chapter 6, but the scale efficiency estimates are used here in line with the literature using the stochastic cost frontier methodology.

inputs if they were operating efficiently. By the same token British banks and W.German banks could produce the same output with 79.19 percent and 77.71 percent of the inputs respectively. The inefficiency scores for each national market are very similar, however, and they are in line with other studies' findings (see Section 7.2, and Evanoff and Israilevich 1991).

The analysis of bank inefficiency scores in each country separately reveals which size of bank (size is measured by total assets) operates more efficiently than others. In W. Germany, medium size banks (those with total assets between £10 and £25 billion) were the least efficient (mean 0.2864), while the largest sized banks (total assets in excess of £25 and £50 billion) were the most efficient (although the smallest size institutions were not far behind). These figures also suggest that the maximum inefficiency score recorded by a W.German bank reached a substantial 0.4653 and the minimum was 0.1052.

In relation to French banks, the small to medium size institutions (£1-£10 billion in total assets) were the least efficient (mean 0.349), while the largest size banks were the most efficient. However, these results may only be indicative since there are only two banks in the two largest size categories.

In contrast to French banks, the inefficiency scores of the British banks show that the largest size banks (total assets in excess of £50 billion) are the least efficient (mean 0.2406), while the second largest size banks (£25-£50 billion in total assets) are the most efficient (mean 0.1395). Moreover, the most efficient British institution (National and Provincial Building Society) could produce its output with 90.15 percent of its inputs and the least efficient British bank (Clydesdale Bank Plc.) could produce its output with 65.74 percent of its inputs.

The scale efficiency estimates shown in Table 7.5 indicate that banks in all three markets are characterised by economies of scale. The strongest economies of scale are displayed by British banks (X-inefficiency scores indicate that they are on average the most efficient banks as well). The economies of scale estimate of 0.7739 means that British banks can double their output by increasing the quantity of their inputs by only 77.39 percent. These estimates also suggest that all bank sizes display economies of scale; the strongest economies of scale (0.7921) shown by the smallest sized banks and the weakest economies of scale (0.8183) benefiting the largest sized banks.

As regards W. German banks, all bank sizes are found to enjoy economies of scale as well, with a mean for all banks of 0.8572. However, the mean estimates for French banks are somewhat different. All bank sizes except the largest sized banks seem to be characterised by economies of scale. The figure for the largest sized banks is very close to one indicating the existence of constant returns to scale. As in the British sample, the smallest sized banks exhibit the strongest economies of scale (0.8044), suggesting that a doubling a bank output can be achieved by increasing the quantity of their inputs by 80.44 percent.

Moreover, the scale economies estimates for the pooled three country sample agree with the above observed estimates. All bank sizes display economies of scale, with the smallest sized banks displaying the strongest economies (0.7859) and the largest sized banks exhibiting the weakest economies of scale (0.901).

Table 7.1. Descriptive statistics of inefficiency scores according to banks' size and countries.

Assets size (m £)	Mean	Median	Stand. Dev.	Min.	Max
0-1000	0.2136	0.204	0.0561	0.144	0.4069
1000-10000	0.2274	0.226	0.0543	0.1384	0.3723
10000-25000	0.2343	0.2198	0.0551	0.143	0.3667
25000-50000	0.2	0.193	0.0326	0.1546	0.2533
50000<	02521	0.2473	0.0435	0.1958	0.3369
Germany (all banks)	0.2229	0.2185	0.0414	0.144	0.3667
France (all banks)	0.2452	0.2435	0.0564	0.1384	0.4069
U.K (all banks)	0.2081	0.1838	0.064	0.1398	0.3723

Table 7.2. Descriptive statistics of inefficiency scores according to banks' size for German banks.

Assets size (m £)	Mean	Median	Stand. Dev.	Min.	Max
0-1000	0.2089	0.1948	0.0917	0.1135	0.4653
1000-10000	0.2362	0.2227	0.0846	0.1052	0.443
10000-25000	0.2864	0.2495	0.1	0.1709	0.4658
25000-50000	0.1982	0.1511	0.0944	0.1366	0.3069
50000<	0.1989	0.198	0.0459	0.1535	0.2452

Table 7.3. Descriptive statistics of inefficiency scores according to banks' size for French banks.

Assets size (m £)	Mean	Median	Stand. Dev.	Min.	Max
0-1000	0.2729	0.2538	0.1475	0.117	0.602
1000-10000	0.349	0.3228	0.1857	0.1268	0.8335
10000-25000	0.2593	0.2614	0.1056	0.1365	0.3932
25000-50000	0.1379	0.1379	-	0.1379	0.1379
50000<	0.1726	0.1726	-	0.1726	0.1726

Table 7.4. Descriptive statistics of inefficiency scores according to banks' size for British banks.

Assets size (m £)	Mean	Median	Stand. Dev.	Min.	Max
0-1000	0.1743	0.1475	0.0676	0.1044	0.327
1000-10000	0.1974	0.1883	0.067	0.0985	0.3426
10000-25000	0.1703	0.1796	0.0349	0.1214	0.2007
25000-50000	5	0.1142	0.0518	0.1051	0.1991
50000<	6	0.2411	0.0898	0.1533	0.327

Table 7.5. Scale efficiency estimates (means) according to bank size and countries.

Assets size (m £)	Germany	U.K	France	Overall
0-1000	0.8611	0.7921	0.8044	0.7859
1000-10000	0.8624	0.8049	0.9238	0.8412
10000-25000	0.8638	0.8129	0.896	0.8709
25000-50000	0.8646	0.8123	0.8859	0.8728
50000<	0.8654	0.8183	1.0086*	0.901

Notes: These estimates are all cost elasticities. Figures greater than 1 denote diseconomies of scale, figures less than 1 denote economies of scale and figures equal to 1 denote constant returns to scale. These estimates are all statistically significantly different from 1 apart from where constant returns to scale are present (denoted by *).

The next section presents our empirical results of estimating equations (5), (6) and (7), that is a system combining the two market structure hypotheses with the two efficient structure hypotheses.

7.5.2 Empirical findings: pooled cross-country estimates.

Table 7.6 presents the results of estimating the effect of market structure and efficiency variables on gross profit rates (gross profits/total income is the dependent variable). The empirical findings shown in Table 7.6 indicate that both the market structure variables, namely, the bank share of total assets and the three-firm concentration ratio, are statistically significant but they are negatively associated with bank profits. The two efficient structure variables (X-EFF and S-EFF) both display negative signs but they are statistically insignificant (although X-EFF almost reaches significance at the 10 percent level). Therefore, the two efficient structure variables do not seem to help in the explanation of the variability of bank profits and these results do not provide any support for the two efficient structure hypotheses incorporated in the model of equation (5). Moreover, the per capita income control variable is also found to be statistically significant and negatively affecting bank profits, while the size variable TAINV has a positive sign and is statistically insignificant. These findings indicate that a 10 percent increase in a bank's share of total assets (or in the three-firm concentration ratio) will result in a 0.56 (7.69) percent decrease in its total gross profit rates. Although, the change in the market share variable has a very small impact on profits, the change in the concentration ratio affects profits quite considerably.

Table 7.6. The effect of market structure and efficiency variables on gross profit rates (gross profits/total income).

Variable name	Est. coefficient	T-ratio (162 DF)	Elasticity at means	Standard error
MS	-1.5139	-1.7326^{b}	-0.0566	0.8737
CONC3	-0.5709	-3.5042^{c}	-0.769	0.1629
X-EFF	-0.3389	-1.2296	-0.399	0.2756
S-EFF	-0.0177	-0.1574	-0.0849	0.1125
TAINV	1151000	0.652	-0.0096	1765200
GDPL	-0.00058	-4.8256^{c}	-3.2674	0.00012
Constant	1.1504	6.9688^{c}	5.9275	0.165

Notes: The superscripts b and c denote significant coefficients at the 5 and 1 percent levels respectively. TAINV[2] is the inverse of total assets, GDPL is a binary variable accounting for per capita income differences in the three countries, X-EFF and S-EFF are the two efficiency variables, MS is each bank's share of total assets and CONC3 is the three-firm concentration ratio. R-square adjusted = 0.1835.

Diagnostic tests were also carried out to see whether heteroscedasticity is present. The χ^2 values for the B-P-G, Harvey and Glejser tests are: χ^2 = 11.43 with 6 degrees of freedom (DF; B-P-G test), χ^2 = 8.28 with 6 DF (Harvey test) and χ^2 = 12.24 with 6 DF (Glejser test). These values do not exceed $\chi^2_{0.95}$ (6 DF) = 12.59 and therefore the null hypothesis holds, and homoscedasticity is present.

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[2]. The inverse of total assets variable is included to account for size effects. It has been assumed that the effect of concentration on banking profits is greater, the greater the volume of loans and deposits a bank is holding. In other words, holding all variables constant, the effect of concentration on profits is likely to be greater for a larger bank than a smaller bank.

Table A3.19 in Appendix 3 presents the results of the same estimation when all market share variables are included (as in Chapter 5) in addition to the efficiency variables. These results do not differ from the findings of Table 7.6. Both efficiency variables are statistically insignificant, with X-EFF having a negative sign and S-EFF displaying a positive sign (in agreement with Table 7.6). Moreover, the share of total assets and the three-firm concentration ratio are found to be statistically significant and negatively affecting bank profits.

It is important to note that these results are very similar with the findings of the estimation of the market structure framework (associating various market share variables with bank performance measures) investigated in Chapter 5 (Table 5.6). In both cases, market shares (share of total deposits in Table 5.16) were found to be negatively affecting bank profit rates. The adjusted R-square reported in Table 7.6 is 0.1835, indicating that this model explains 18 percent of the variability of bank profits. The adjusted R-square in Table 5.6 was 0.3779, which means that the incorporation of the two efficiency variables in the framework of equation (5) did not improve the explanatory power of our profitability equations.

Table 7.7 shows how another performance measure (gross profits/operating expenses) is affected by the market structure and efficiency variables. The results of Table 7.7 confirm the findings of Table 7.6. The market share and concentration variables are both statistically significant and both have negative signs. The two efficiency variables are both statistically insignificant and they both display negative signs (as in Table 7.6). Therefore, these results seem to suggest that efficiency (X-efficiency or scale-efficiency) has no significant impact in the determination of bank profits, which are affected by the prevailing market structure conditions in a particular market. The explanatory power of this model reached 20 percent (R-square adjusted = 0.2033)[3]. These results are confirmed by the

[3]. The R-squares reported here are very similar (in some cases higher) with those reported in Berger's (1995) study.

findings shown in Table A3.20 in Appendix 3 (all market share variables are included in the estimation).

Table 7.7. The effect of market structure and efficiency variables on gross profit rates (gross profits/total operating expenses).

Variable name	Est. coefficient	T-ratio (162 DF)	Elasticity at means	Standard error
MS	-5.7014	-2.2881^{b}	-0.1332	2.4917
CONC3	-1.3186	-2.8377^{c}	-1.1092	0.4646
X-EFF	-0.2781	-0.3538	-0.2045	0.786
S-EFF	-0.0809	-0.2522	-0.2422	0.3208
TAINV	4644700	-0.9226	0.0242	5034000
GDPL	-0.00019	-5.5899^{c}	-7.4839	0.000034
Constant	3.1538	6.6992^{c}	10.14	0.4707

Notes: The superscripts b and c denote significant coefficients at the 5 and 1 percent levels respectively. R-square adjusted = 0.2033.
The χ^2 values for the B-P-G, Harvey and Glejser tests are: $\chi^2 = 10.32$ with 6 degrees of freedom (DF; B-P-G test), $\chi^2 = 9.64$ with 6 DF (Harvey test) and $\chi^2 = 10.64$ with 6 DF (Glejser test). These values do not exceed $\chi^2_{0.95}$ (6 DF) = 12.59 and therefore the null hypothesis holds, and homoscedasticity is present.

The insignificance and the negative signs associated with the two efficiency variables proved to be the consistent outcome when : a). the share of total assets was replaced by the share of total deposits and in another estimation by the share of total loans, b). the three-firm asset concentration ratio was successively replaced by the five-firm and the ten-firm asset concentration ratios (percentage of total domestic market assets held by the three, five and ten largest banks in each national market), c). gross profits was replaced by net profits and d). gross profits was replaced by total income (see Tables A3.21 and A3.22 in Appendix 3). Furthermore, the share variables and the concentration ratios were consistently found to be statistically significant and negatively related with the dependent variable in all cases a, b, c and d.

The statistical insignificance of the two efficiency variables does not lend any support for the efficient structure hypotheses and therefore the investigation of the second necessary condition (for the two hypotheses to hold), that X-EFF and S-EFF are positively related with market share and concentration ratio variables, becomes irrelevant[4].

7.5.3. Empirical findings: individual country estimates.

This section investigates the market power and efficiency structure hypotheses using each national market sample separately. The number of the independent variables is reduced by two, since the concentration ratios (CONC3) and per capita income variables (GDPL) are constants for all banks established in the same domestic market. Therefore, it is implicitly assumed here that the effect of concentration is picked up by market share, an assumption which is supported by Berger (1995) in his pioneering attempt to determine whether efficiency affects market structure and bank performance.

Table 7.8 presents the results of estimating the relationship between market structure, efficiency and gross profit rates (gross profits/total income). The empirical findings reported in Table 7.8 differ from country to country. In the W. German sample the share variable (share of total assets) was found to be statistically significant and positively affecting bank profits, but the two efficiency variables were both statistically insignificant (X-EFF having a negative sign and S-EFF a positive sign). In the French sample, the only independent variable appearing to have a statistically significant impact in the determination of bank profits is the size variable TAINV. The results of the British sample, however, indicate that both the share

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[4]. Tables A3.23 and A3.24 in Appendix 3 depict these relationships. These findings show that the two efficiency variables are statistically significant and positively affecting the three-firm concentration ratio. As regards the effect of the two efficiency variables on market share, they are both statistically significant but X-EFF positively affects the share of total assets and S-EFF negatively affects the share of total assets.

variable STA and the scale efficiency variable S-EFF, are statistically significant but they display the unexpected negative sign, suggesting that banks that are more scale efficient and have greater market power have lower profits than their competitors. Therefore, these empirical findings are in line with earlier results (Tables 7.6 and 7.7), in providing no evidence to support the supposition that efficiency affects spuriously both market structure and bank performance.

Table 7.8. The effect of market structure and efficiency variables on gross profit rates (gross profits/total income).

Variable name	W. Germany	France	U.K
	Estimated coefficients (t-statistics in parentheses)		
MS	2.9741 (1.6822[b])	0.5907 (0.344)	-1.9021 (-1.37[a])
X-EFF	-0.2119 (-1.024)	-0.1736 (-1.234)	0.6274 (0.995)
S-EFF	0.0729 (0.5105)	0.0124 (0.08)	-0.633 (-1.59[a])
TAINV	-20048 (-0.0137)	3309300 (2.59[c])	6109700 (3.65[c])
Constant	0.1502 (1.116)	0.1159 (0.68)	0.713 (2.54[c])

Notes: The superscripts a, b and c denote significant coefficients at the 10, 5 and 1 percent levels respectively. R-square adjusted = 0.05 for the W. German sample, 0.1173 for the French sample and 0.4504 for the British sample.

The χ^2 values (British sample) for the B-P-G, Harvey and Glejser tests are: χ^2 = 3.97 with 4 DF (B-P-G test), χ^2 = 3.67 with 4 DF (Harvey test) and χ^2 = 4.83 with 4 DF (Glejser test). These values do not exceed $\chi^2_{0.95}$ (4 DF) = 9.48 and therefore the null hypothesis is holds, and homoscedasticity is present. Similar tests for the W. German and French samples also show the null hypothesis to hold..

Table 7.9 reports the results of a similar estimation where the dependent variable is replaced with gross profits divided by operating expenses in an effort to confirm our earlier findings..

Table 7.9. The effect of market structure and efficiency variables on gross profit rates (gross profits/total operating expenses).

Variable name	W. Germany	France	U.K
	Estimated (t-statistics	coefficients in parentheses)	
MS	3.8309 (1.087)	0.4074 (0.127)	-1.4852 (-0.38)
X-EFF	-0.3814 (-0.925)	-0.3153 (-1.203)	1.55 (0.87)
S-EFF	0.0015 (0.005)	0.2276 (0.789)	-2.3247 (-2.08^{b})
TAINV	-381780 (-0.131)	5529700 (2.32^{b})	3500000 (7.44^{c})
Constant	0.2929 (1.091)	-0.0324 (-0.102)	2.0585 (2.609^{c})

Notes: The superscripts b and c denote significant coefficients at the 5 and 1 percent levels respectively. R-square adjusted = 0.03 for the W. German sample, 0.108 for the French sample and 0.4289 for the British sample.
The χ^2 values (British sample) for the B-P-G, Harvey and Glejser tests are: $\chi^2 = 2.41$ with 4 DF (B-P-G test), $\chi^2 = 2.21$ with 4 DF (Harvey test) and $\chi^2 = 4.27$ with 4 DF (Glejser test). These values do not exceed $\chi^2_{0.95}$ (4 DF) = 9.48 and therefore the null hypothesis holds, and homoscedasticity is present. Similar tests for the W. German and French samples also show the null hypothesis to hold.

The results shown in Table 7.9 do not support either the market power or the efficient structure hypotheses confirming the earlier findings. The share of total assets and the X-efficiency variables are statistically insignificant in all three national samples and the scale efficiency variable is only significant in the British sample, but displays a negative sign (as in Table 7.8).

Furthermore, the investigation of the second necessary condition (for the two efficient structure hypotheses to hold), that X-EFF and S-EFF are positively related with market share and concentration ratio variables, becomes irrelevant since there is no evidence that the first condition holds[5].

7.6 Conclusion.

This chapter has tried to distinguish among the market-structure and efficient-structure hypotheses by incorporating into our empirical analysis measures of X-efficiency and scale-efficiency. Tests of the four hypotheses (the two market power hypotheses and the two efficient structure hypotheses) were performed by regressing measures of concentration, market share, X-efficiency and scale efficiency against profits.

Our empirical findings seem to suggest that the two efficient structure variables do not help in the explanation of the variability of bank profits and hence, these results do not provide any support for the two efficient structure hypotheses (X-efficiency hypothesis and scale efficiency hypothesis). Moreover, both market structure variables (the share of total assets and the three-firm concentration ratio) are statistically significant but they are negatively associated with bank profits.

These results are, to a certain extent, similar to Berger's (1995) findings. Berger found a strong statistically significant positive relationship between profits and market shares but only very little limited support for the X-efficiency hypothesis and no support at all for the scale efficiency hypothesis. Additionally, the efficiency and market power variables explained very little of the variance of banking profitability in his model.

Our findings also indicate that big banks are more X-efficienct than small banks. This result, in addition to the findings of the previous chapter that showed that significant

[5]. Table A3.26 in Appendix 3 shows that there is no significant association between the two efficiency variables and market share.

economies of scale are present in the European banking markets under study, seem to suggest that there are cost advantages associated with greater bank size. Thus, the establishment of the European Single Market and the expected benefits of exploiting economies of scale (and the possible expectation of increased competition among European banks) may strengthen the need to operate more efficiently and lead the banking industry towards achieving considerable cost savings and, hence, higher profitability.

Although, we did not find any evidence to support the efficiency structure hypotheses, more work on efficiency, market structure and bank performance issues needs to be undertaken so as to evaluate how these relationships affect the workings of the banking system. This should provide the authorities with more valuable insights concerning efficiency and bank size in relation to banking performance (thus helping to promote the correct deregulatory and competition and merger policies).

The next final chapter summarises the objectives undertaken in this thesis and presents our conclusions.

CHAPTER 8
CONCLUSIONS.

8.1 Conclusion.

This thesis examined the structure-performance relationship in the three largest European banking markets and also investigated the related areas of economies of scale and X-efficiency. The thesis aimed to evaluate what would potentially happen to banking competition, banking services, banking prices, profits and costs as a result of the new regulatory regime that created an integrated European banking market.

As we have seen, the E.U Commission (**European Economy**, March 1988 and May 1988 and "Research on the costs of non-Europe", 1988) stated that the creation of the single market will enhance competition and therefore produce better and cheaper banking products and reduced profit rates. This sequence will partly stem from the exploitation of banking economies of scale and the reduction of X-inefficiencies. The main beneficiary reaping the benefits that will follow from the establishment of the Single European Market will be the European consumer who will be rewarded with better and cheaper financial products and services. Greater competition is also expected to lead to the creation of new products and services as the need to innovate and gain competitive advantage is increased.

This thesis has sought to evaluate the nature of these possible developments by analysing the relationship between market structure and banking characteristics such as banking prices, interest rates and banking costs. Once this relationship is established and the effect of changes in market structure on banking characteristics is measured, we may draw some conclusions and attempt some predictions regarding the likely consequences of the creation of the Single European Market on the banking sectors of the U.K, France and W. Germany.

Following the traditional s-c-p approach, this study first hypothesised that banks operating in concentrated markets charge higher prices for their services and obtain higher profits than banks operating in more competitive environments. We then suggested that banking profits and interest rates are positively affected by a series of market shares (measuring a bank's involvement in various asset and liability categories) rather than one market share variable, as many authors of previous empirical studies have argued. Moreover, we tested the efficient-structure hypothesis which postulates that efficiency (measured by X-efficiency and scale efficiency) is the factor that positively influences both market shares and bank profits. In addition, this thesis also explored the important issue of economies of scale.

The empirical findings presented in Chapter 5 do not strongly support the supposition that banking performance measures are positively correlated with bank market shares. More specifically, as regards the estimated effects of bank market shares on profitability, the performance of the shares of total deposits and total loans is rather mixed. In most cases, they are found to be statistically significant; although the signs attached to them differ from sample to sample. The share of total deposits is found to be positively related with bank profitability in the W. German market, but in certain cases it is found to be negatively correlated with bank profitability in the French and British markets. In contrast, the share of total loans is found to be negatively related with bank profitability in the W. German and British markets, but it is found to be positively correlated with bank profitability in the French market.

Mixed results are also found in the case of net interest margins, which are found to be positively related to deposit and loan market shares in the W. German and U.K market, but negatively related in France.

These empirical findings seem to suggest that the positive relationship between size and banking profits and prices is a tenuous one (and even negative in some cases). If the European Single Market does allow banks to achieve greater market shares in certain activities (in the deposits and loans markets), it is no means certain that this will yield higher profits or margins. On the other hand, if the European Single Market results in strengthening competition among banks, this may contribute to bring about lower margins. The likely consequences regarding banking profitability are ambiguous since greater market shares in some activities are expected to have a positive impact on banking profitability, whereas greater market shares in certain other activities might bring about lower banking profitability.

Therefore, if the appropriate authorities wish to create a banking environment that will be a fertile ground for lower banking prices, they should consider taking actions and measures that will intensify competition among banking institutions and, moreover, they may well be justified in allowing mergers between large banks, because this thesis shows that the potential impact on margins through market share is, at most, quite small and the direction of the impact ambiguous.

The results presented in Chapter 6 show that banks in all our samples are characterised by overall and partial economies of scale and economies of scope. Economies of scale estimates ranged from 0.4465 to 0.8321. British banks enjoyed the strongest economies of scale among the three national markets and the largest banks in all samples were associated with small economies of scale, while the smallest banks were characterised with the largest economies of scale. This is a finding one would expect, given the shape of the long-run average cost curve. Hence, there is some evidence that smaller banks have the greater potential to realise further economies of scale. Moreover, our findings also suggested that French banks exhibit substantial economies of scope, whereas W. German and British banks are characterised by diseconomies of scope.

Overall, these results indicate that there exist significant economies of scale across a broad range of outputs suggesting that there are cost advantages associated with greater size. Therefore, mergers between banks that increase the scale of operations and/or expand the joint production of products and services may be expected to yield cost savings and, consequently, cost considerations may be the incentive behind proposed mergers. However, public policy that aims to increase bank scale by encouraging mergers or through controlling entry cannot be justified on the basis of cost savings alone; the interests of competition and the advantages associated with strengthening it must not be ignored.

The results of Chapter 7 seem to indicate that there is no evidence to support the efficient-structure hypothesis. Both efficient structure variables (X-efficiency and scale efficiency) included in our empirical investigation failed to exert any significant influence in the explanation of the variability of bank profits and interest rates. However, there is evidence to suggest that large banks are more X-efficient than small banks.

This result, in addition to the findings of Chapter 6 that showed that significant economies of scale are present, lends more credence to the argument that larger banks have greater cost advantages than smaller banks. Thus, the establishment of the Single European Market and the expected benefits of exploiting economies of scale in conjunction with the need to operate more efficiently and diversify credit risks and financial products might lead the banking industry towards achieving considerable cost savings and, hence, higher profitability. Given that the earlier analysis suggests that there is little evidence to indicate that banks with larger market shares are substantially more profitable or charge higher margins than smaller banks, public policy concerns about increased banking concentration and the role of market power perhaps have been overstated. Additionally, more efficient larger banks may be expected to improve the quality (and/or range) of the financial products and services they produce, thus benefiting the European consumer.

Most scholars studying the European banking system agree on the likely effects of the establishment of the Single European Market and the structural changes that will almost certainly follow. It is widely accepted that competition in the banking markets will be intensified (both price and quality competition) and as a result banking profits and banking prices are expected to be decreased (as monopoly profits are eradicated). Banks will increasingly be recognising the need to reduce costs and become ever more efficient in the production of their services and allocation of their resources.

The increased desire of bank managements to minimise average operating costs and eliminate any existing inefficiencies as well as to diversify their credit risks will hasten the already observed course towards mergers, take-overs and other co-operative agreements between banks in the same banking market and/or across national borders. An across-the-border merger (or take-over) between two E.U banks will provide both partners access to each other's domestic markets, an aim which otherwise would have been very costly to achieve (through *de novo* entry). Moreover, in cases where one of the merging partners is operating considerably less efficiently than the other, a merged bank may achieve greater cost savings by eliminating previous inefficiencies and through greater diversification of credit risks.

However, complete freedom of entry in all financial services for European banks may result in lessening rather than enhancing competition in some services. This development may be brought forward as the need for specialisation in the most cost effective and better performing market segments becomes more evident (especially among small and medium size banks) and, hence, bank exit from certain market segments is accelerated as small and medium size banks choose to become specialised institutions. The lessening of competition will also be reinforced as banks start to merge and/or co-operate with each other in order to be better positioned to face the challenges of freer markets. Therefore, if the European supervisory and regulatory authorities do not take the appropriate measures, increased merger and take-over activity might result in the weakening of competition among banking institutions.

A very good example of the right regulatory policy exercised on mergers, is presented in the recommendations of the British Monopolies and Mergers Commission (MMC) regarding the acquisition proposal between Credit Lyonnais SA and Woodchester Investments plc[1]. On 26 June 1990, Credit Lyonnais decided to extend its existing 29.85 per cent shareholding of Woodchester to 45.4 per cent through subscription for new shares in Woodchester. It was because of this proposed acquisition that the case was referred to the MMC by the Secretary of Trade and Industry who was particularly alarmed by the fact that Credit Lyonnais is a state owned foreign bank and therefore its increased involvement in the U.K domestic market might prove to operate against the public interest.

The MMC looked at the two companies' main activities in the U.K. Woodchester's main activities were restricted to instalment credit, mortgage lending, equipment leasing, insurance and trade finance, whereas Credit Lyonnais's main activities include deposit taking, corporate lending and financial advice, merchanting, broking in futures, commodities and financial markets, equities brokerage, fund management, currency trading, insurance, trading

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1.The Monopolies and Mergers Commission, **Credit Lyonnais SA and Woodchester Investments Plc.: a report on the merger situation**, (London: HMSO, Dec. 1990).

on the London discount market, Eurobond trading, mortgage finance, trade finance, equipment leasing and instalment credit. Thus, the two companies activities are mostly complementary and there is little overlap concentrated in the markets for equipment leasing, instalment credit, mortgage finance and trade finance. The market power of the two companies (taken separately or together) is very little indeed; their market shares of various U.K domestic market bank activities are very small and in some cases negligible.

Consequently, the MMC concludes that:

"... having found that the two companies have only a very small presence in the market..... we are satisfied that the merged company would not exert its position in the market in an anti-competitive manner..... Hence, we conclude that the proposed merger may be expected not to operate against the public interest" (p. 24).

In relation to the DTI's reservations about Credit Lyonnais's ownership status, the Commission's investigation did not produce any evidence pointing to possible adverse effects (effects against the public interest) stemming from the proposed merger. This argument was moreover strengthened by assurances given by Credit Lyonnais that it intended to leave the Woodchester management free to conduct the company' day to day business.

The MMC's handling of this particular case lends considerable weight to our argument that a merger would not be against the public interest when it does not result in reducing competition (when it does not bring forward anti-competitive effects). Regulatory and supervisory authorities will have to take into account concentration ratios (and/or market shares) in all bank activities, in order to assess a merger's likely effects on competition..

Therefore, if the primary aim is to enhance competition in the banking markets, the appropriate supervisory and regulatory authorities must take the appropriate measures to encourage entry into the most concentrated market segments and thus analyse all bank operations' concentration ratios and the expected impact on sector performance. Hence, a merger between two banks will be desirable if it does not increase concentration in most activities that the banks engage in. In other words, desirable mergers would probably be those where the merging banks' portfolios are complementary rather than substitutes to each other. Intuitively, mergers between two big domestic banks will almost certainly reduce competition in various bank operations and therefore such mergers will come under much greater scrutiny.

The most likely development that will characterise the European banking market scene in the next few years (and one which is already taking place) will be mergers between banks and acquisitions and take-overs of small sized financial institutions by medium and large sized banks and other various types of cooperations and agreements between banks, aiming to increase market share and diversify their credit and other risks. In the last three years, there have been several examples of European banks proceeding with mergers and co-operations among each other. In the U.K, Lloyds Bank took over Cheltenham and Gloucester Building Society, Halifax Building Society merged with Leeds Building Society announcing their intention to become a bank, Abbey National took over National and Provincial Building Society, and Bradford and Bingley Building Society announced that they have plans to open a branch in Hamburg in Germany (*Financial Times* 4 Nov. 1993 and 16 Oct. 1993, *The Banker*, Nov. 1993 and *The Guardian* 3 Feb. 1996).

The changing structural banking environment will have mixed effects on banking profits, interest rates and costs. Banking profits and interest rate margins will not necessarily be reduced as competition is strengthened (or alternatively increased if competition is actually weakened). The empirical findings of this study seem to suggest that the correlation between size and banking profits and prices is a tenuous one (and even negative in some cases). Therefore, banking profits and interest rate margins might not be significantly affected if the establishment of the European Single Market creates a substantial merger movement among banking institutions. However, the need to operate more efficiently and diversify credit and other risks, as well as developing new financial products might lead the banking industry towards achieving considerable cost savings.

Therefore, many distinguished scholars of economics seem to agree that expected developments in the European banking market scene will affect the degree of competition both positively and negatively and whether competition will actually be increased or decreased remains to be seen.

8.2 Limitations of the study.

Overall, this thesis has advanced our knowledge of the workings of European banking systems by providing new insights concerning the relationship between market structure, efficiency and bank performance and the significance of economies of scale and scope. Our analysis, however, has its limitations.

Although our three national market samples are representative of the banking structure in the corresponding countries, the number of banks used in the analysis is rather small. Furthermore, our empirical investigation is restricted to a cross-sectional analysis covering only one year, 1990. Empirical studies investigating a number of years and examining more national markets, should shed more light on the debate regarding the validity of the s-c-p paradigm and the importance of economies of scale and scope in European banking.

A significant problem with all studies of this nature pertains to the considerable accounting differences in the balance sheet statistics of European banks. Moreover, there are considerable differences between country-specific regulatory regimes that affect bank performance and, hence, cross-country comparisons of results and policy recommendations must be viewed with caution. These considerations also apply to the results relating to the all-country sample, since the exercise of pooling together banks from different European countries suffers from the same shortcomings. However, the Single European Market programme aims to eliminate all these differences and create one common regulatory regime across the E.U.

There are some limitations in our selection of the appropriate measures of performance. A great majority of studies relate the prices of a single product to overall measures of monopoly power, while banks are multiproduct firms. Data availability restrictions force the inclusion of proxy variables which may not be adequately befitting and therefore the predicted size and sign of estimated relationships may be distorted. An example of a widely accepted proxy variable is the net interest income variable, which is used in this study as well, in the place of interest rates charged on loans and interest rates paid for deposits.

The theoretical framework developed in this thesis assumes that banks' sole objective is the maximisation of their profits. However, this may not be the case and managerial objectives may vary systematically with ownership type (state-owned, mutual, private), firm size and market power. As bank size and profits are increased managers may adopt expense-preference behaviour and choose to spend more on managerial expenses rather than reporting higher profits (for whatever reasons there may be). State-owned and mutual banks may also pursue objectives other than profit maximisation. Although, the evidence presented in this study did not support the expense-preference hypothesis, banking firms more often than not, do tend to underestimate the actual level of their profits and hold some of is as hidden reserves; such behaviour would obviously weaken the structure-performance relationship. We did not test to see whether the s-c-p and efficiency hypotheses varied according to different bank ownership types because of limitations associated with the data sample.

Moreover, it has been recognised (Clark 1986b and others) that banks' risk-return preferences may vary with the degree of concentration in different markets and the higher the degree of concentration the higher the desire to hold less risky assets will be. Clark (1986b) suggested that risk and profitability must be determined simultaneously, otherwise equations that ignore risk may very well be mispecified. However, the empirical evidence presented in the s-c-p literature is inconclusive and therefore this thesis has not attempted to account for bank managements' risk preferences; such an approach might be a worthwhile attempt for future research projects.

Many commentators have correctly pointed out (Evanoff and Fortier 1988, and others) that the existence (or absence) of barriers to entry is very important in affecting bank performance. The threat of competition (potential entry) may lead to lower profits than otherwise, even when concentration is high in a particular market. Barriers to entry may be regulatory and non-regulatory. Regulatory barriers to entry take the form of branching restrictions and thus have a direct effect on the degree of competition. Non-regulatory barriers to entry, such as the absence of knowledge and lack of experience regarding the workings of a "foreign" (other member states) banking system and the "relative minimal efficient size of firm" may discourage potential entrants and therefore influence the prevailing market structure environment of the Single European Market. There is evidence that the structure-performance relationship is strengthened when differences in entry barriers across markets are accounted for (Evanoff and Fortier 1988).

Finally, the definition of an appropriate market area is a difficult exercise since many banking institutions conduct their businesses in particular regions of a country and do not cover whole domestic national markets (W. Germany) and therefore their market shares of banking operations in their region may be substantially large and at the same time their market shares in the whole of the domestic banking market may be negligible. The examination of the structure-performance relationship in regional markets would be free of this shortcoming and may be taken as a possible avenue for further research. Moreover, due to the fact that banking is a multiproduct industry, the selection of a single appropriate measure of market structure is another issue that raises many questions as no such measure precisely reflects the degree of monopoly in a banking market. Honohan and Kinsella (1982) showed that one may draw very different conclusions regarding the degree of concentration in a banking market depending on the concentration ratios used. Their preferred measure of concentration ratio is a Herfindahl index that is scaled up (adjusted) by an amount that is proportionate to the size or the square root of national GDPs. However, this study has used a series of national market shares in addition to market concentration ratios and therefore the potential impact of this shortcoming is limited.

Furthermore, there are certain shortcomings associated with the translog functional form and the stochastic cost frontier approach adopted in the cost efficiency part of our thesis. As Diewert (1992) has pointed out, the translog functional form has a large number of parameters which may distort estimates by causing multicollinearity between the explanatory variables. There has also been considerable criticism of the stochastic cost frontier approach which was used to derive inefficiency measures. These inefficiency measures enter the function through the error component and this means that the estimated inefficiencies are uncorrelated with the explanatory variables and the scale economies that are derived from these variables. It also means that the inefficiencies are drawn from an assymetric half-normal distribution, but Greene (1990) has suggested that the half-normal distribution is inflexible and it implicitly assumes that most observations are clustered near full efficiency. Moreover, Caves and Barton (1990) have argued that the half-normal assumption for inefficiencies is violated for many banks and manufacturing industries. Further research may focus on examining the relationship between ownership characteristics and bank efficiency across European markets. X-efficiency comparisons may be undertaken using alternative stochastic cost frontier specification or alternatively by using the linear programming DEA approaches.

A further limitation of this study relates to our choice of variables representing bank output. It does not take into account banks' off-balance sheet activities, which have become increasingly important. Furthermore, our whole approach and methodology has been based on the assumption that banks are profit-maximising firms, although, non-profit maximising behavioural models may be more appropriate in analysing the objectives and behaviour of modern banks and, therefore, such an approach may be adopted for further research.

However, despite the aforementioned shortcomings and limitations which no doctoral thesis may be expected to be free of, the specific aims which have been set out in this thesis have been achieved and the empirical evidence presented here provides new insights into the workings of the three largest European banking systems.

APPENDIX 1.

DESCRIPTIVE STATISTICS OF MARKET STRUCTURE AND BANK PERFORMANCE MEASURES.

1.1 Market structure and profitability.

1.1.1 Variable description.

Table A.1 presents descriptive statistics for all variables (dependent and independent) involved in our empirical estimations.

Table A.1. Descriptive statistics of bank performance measures of W. German, French and British banks.

	VARIABLE	MEAN[1]	STAN. DEV.	VARIANCE	MINIMUM	MAXIMUM
	PRGROSS	36,842	112,350	12,622E+08	-25,547	825,230
W.German	PRNET	22,488	66,178	43,795E+07	0	429,500
	Y	190,790	415,740	17,284E+08	10,324	2,137,000
banks	PRY	0.09548	0.09675	0.00936	0.02959	0.64534
	PRW	0.90616	4.3212	18.673	0.0726	29.811
	PRE	0.23827	0.27321	0.07464	0.01333	1.8712
	PRGROSS	24,768	48,162	23,196E+08	-1,930	294,230
French	PRNET	16,657	33,530	11,243E+08	-1,805	205,920
	Y	282,250	391,190	15,303E+10	4,697	1,843,330
banks	W	61,432	165,430	27,366E+09	8,890	1,063,800
	YW	28.01	73.08	5341.6	1.73	374.08
	YTD	7.68	29.48	869.27	0.0213	188.51
British	PRGROSS	100,770	17,378	30,201E+09	-67,988	760,000
	PRNET	57,136	106,990	11,448E+09	0	428,000
banks	W	194,800	429,230	18,424E+10	1,823	2,132,000
	PRW	1.19	1.23	1.51	-0.7325	5.21

Notes: The figures for PRGROSS, PRNET and Y are expressed in thousands of pounds sterling. PRGROSS is gross profits, PRNET is net profits, Y is total banking income, PRY is

[1]. This is simply the arithmetic mean, which is derived by adding together all the values in the set and dividing the total by the number of observations.

gross profits divided by total banking income, PRW is gross profits divided by personnel expenses, PRE is gross profits divided by total operating expenses

Table A.1 indicates that W. German banks' mean gross profits reached £36.8 million, with a minimum of £-25.5 million and a maximum of £825.2 million. The mean of net banking profits (gross profits after taxes) was £22.4 million, with a minimum value of zero and a maximum of £429.5 million. The variance of both gross and net profits was very large reflecting a very high degree of dispersion of observations around the mean (both positive and negative profit figures were observed). The mean of total banking income (Y) rose to £190.7 million, with a minimum of £10.2 million and a maximum of 2,137 million. The profit rates PRY, PRW and PRE all had means that did not exceed unity, which means that W. German banks' gross profits were smaller than total banking income, personnel expenses and total operating expenses.

French banks' mean gross profits reached £24.7 million (slightly lower than W. German banks' mean gross profits of around £37 million), with a minimum of £-1.93 million and a maximum of £294.2 million. The mean of net banking profits (gross profits after taxes) was £16.6 million, with a minimum value of £-1.8 and a maximum of £205.9 million. The variance of both gross and net profits was very large reflecting a very high degree of dispersion of observations around the mean (both positive and negative profit figures were observed). The mean of total banking income (Y) rose to £282.2 million (in comparison with £190.7 million for W. German banks), with a minimum of £4.6 million and a maximum of 1,843 million. The income rates YW and YTD had means of 28.01 and 7.68 respectively, which means that French banks' total banking income figures were much higher than total personnel expenses and total deposits figures.

British banks' mean gross profits reached £100.7 million (much higher than W. German and French banks' mean gross profits), with a minimum of £-67.9 million and a maximum of £760.0 million. The mean of net banking profits (gross profits after taxes) was £57.1 million, with a minimum value of zero and a maximum of £428.0 million. The variance of both gross and net profits was very large reflecting a very high degree of dispersion of observations around the mean (both positive and negative profit figures were observed). The mean of total personnel expenses (W) rose to £194.8 million, with a minimum of £1.8 million and a maximum of 2,132 million. The profit rate PRW had a mean of 1.19, which means that British banks' total gross profits were (on average) slightly higher than total personnel expenses.

Table A.2. Descriptive statistics of market share variables.

	VARIABLE	MEAN[2]	STAN. DEV.	VARIANCE	MINIMUM	MAXIMUM
	STBS	0.00605	0.0078	0.0000609	0.000248	0.0353
W.German	SS	0.000706	0.00216	0.0000046	0.00000032	0.0104
	SBL	0.00596	0.01107	0.000122	0.0000265	0.0436
banks	SACI	0.00512	0.0105	0.000111	0.000063	0.0524
	SLCI	0.00382	0.00769	0.000059	0.0000507	0.04102
	STD	0.00545	0.0119	0.000142	0.000365	0.05839
	STL	0.00618	0.01155	0.000133	0.000288	0.0519
	STBS	0.0104	0.0232	0.000539	0	0.13478
French	SS	0.00516	0.00919	0.000084	0	0.0357
	SACI	0.00464	0.0139	0.000194	0	0.0871
	SLCI	0.00586	0.0166	0.000275	0	0.1034
banks	SCDS	0.00321	0.0115	0.000132	0	0.0683
	STD	0.00528	0.0164	0.00027	0.0000029	0.0794
	STL	0.00754	0.0188	0.000355	0.0000072	0.1017
	SCDS	0.00169	0.00411	0.0000169	0	0.0173
British	SACI	0.00215	0.00485	0.0000235	0	0.0236
	SLCI	0.00035	0.000872	0.0000076	0	0.00462
	SS	0.0182	0.0399	0.00159	0	0.1976
banks	STBS	0.0203	0.0573	0.00329	0	0.2987
	STD	0.01099	0.0219	0.000479	0.0000353	0.0948
	STL	0.01133	0.02316	0.000536	0.0000181	0.10026

[2]. This is simply the arithmetic mean, which is derived by adding together all the values in the set and dividing the total by the number of observations.

Notes: STBS is the share of Treasury Bills variable, SS is the share of total securities, SBL is the share of total bonds, SACI is the share of total assets from other credit institutions, SLCI is the share of total liabilities owed to other credit institutions. STD and STL are the shares of total deposits and total loans variables respectively.

The market shares' descriptive statistics show that the means of these variables were very small numbers (almost all of them around half a percentage point), with maximum recorded ratios of around 4 to 5 per cent (share of the total domestic market) for W.German banks, 3 to 10 per cent for French banks and 2 to 19 per cent (and even 29 per cent for the share variable STBS) for British banks. The shares of total deposits and total loans both had means of around 1 per cent, with maximum ratios reaching 9.4 and 10.0 per cent respectively, which means that almost 10 per cent of the domestic market for total deposits and total loans is controlled by one big institution.

Table A.3 (next page) shows that W. German bank's mean gross profits, net profits and total banking income rose as the size of the bank (measured by total assets) increased, with one recorded decline for mean profits for the second size category. Total banking income ranged from a mean £15.5 million for the smallest size category to a mean £813.1 million for the largest size category, whereas the mean number of employees reached 13,060 for the largest banks in the sample. This size category (total assets greater than £12 billion) had mean total assets of £40.4 billion, held mean total deposits of £17.8 billion and loaned a mean total volume of £23.3 billion.

French banks' gross profits, net profits and total income are increasing as the size of the banks increases. Mean bank gross profits ranged between £4.9 million (smallest size category) and £61.2 million (largest size category), whereas total income rose to a mean £675 million for banks with total assets exceeding £5 billion. The mean number of employees employed by the French banks reached a low 89.8 and a high 4,594 reported by the largest banks in our sample.

TABLE A.3. Means of selected banking variables for different size categories of W. German, French and British banks.

	VARIABLE	0-500m	500mil.-2bil.	2bil.-5bil.	5bil.-10bil.	>10bil.
	PRGROSS	3,363	4,042	19,245	30,628	193,170
W.German	PRNET	1,534	2,084	7,955	17,149	114,550
	Y	15,553	37,403	101,020	171,930	813,110
	W	8,121	16,869	35,947	55,267	358,160
banks	L	81.6	449.1	1085.4	2153.3	13,060
	TA	349,000	1,369,700	2,994,400	8,637,200	40,419,000
	TD	334,280	731,940	2,000,600	3,450,500	17,847,000
	TL	306,850	674,620	1,788,000	5,005,100	23,332,000
	PRGROSS	4,905	10,591	19,360	61,212	294,230
French	PRNET	3,628	7,451	12,811	40,689	205,920
	Y	21,589	132,710	289,720	675,020	1,843,300
	W	3,207	15,971	44,045	172,920	1,063,800
	L	89.8	523.2	1,104.6	4,594.7	11,005
banks	TA	293,770	1,362,500	3,355,800	21,437,000	102,000,000
	TD	75,463	332,520	841,480	6,257,200	30,891,000
	TL	153,570	476,590	1,470,800	9,264,300	41,710,000
	PRGROSS	3,029	8,197	28,406	27,934	301,240
	PRNET	3,160	6,354	21,298	19,700	163,580
British	Y	2,251	8,421	92,809	41,125	1,946,800
	W	1,656	7,163	39,924	61,544	600,850
	L	89.9	339.6	2,212.4	3,111.8	35,657
banks	TA	281,110	1,115,400	3,267,300	7,125,200	47,278,000
	TD	170,490	772,460	2,691,000	4,434,800	39,583,000
	TL	170,590	630,020	1,540,800	3,682,300	34,487,000

Notes: All figures are expressed in thousands of pounds sterling except those of variable L. PRGROSS is gross profits, PRNET is net profits, Y is total banking income, W is total personnel expenses, L is number of employees and TA, TD and TL is total assets, total deposits and total loans respectively.

British banks' mean gross and net profits and total income are increasing as the size of the bank rises (with one exception being the second largest category of banks which suffered decreased profits). British banks reported mean gross profits that ranged between £3 million and £301.2 million, whereas mean total income ranged between £2.2 million and £1.9 billion. The number of employees working for British banks reached a mean minimum 89.9 and a mean maximum 35,657 employed by the largest category of banks (compared with 4,594 and 13,060 employed by the largest French and W. German banks respectively). Moreover, the largest sized banks' mean total assets reached £47.2 billion, in comparison to £21.4 billion and £40.4 billion mean total assets reported by the largest French and W. German banks respectively.

Table A.4 presents the means of selected important ratios for the same size categories of banks. The figures reported in Table A.4 indicate that the mean ratios of total assets to total deposits and total loans are higher for larger rather than smaller banks which means that smaller institutions attract a greater sterling volume of deposits and loans relative to total assets than larger banks. The lowest ratios were reported by the smallest size banks (1.04 and 1.13 for total assets to total deposits and total loans respectively), whereas the highest ratios (2.5 and 2.03) for larger banks.

The mean figures of total assets per employee initially decrease, then increase and as bank size rises this ratio is alternately registering decreases and increases; the highest figure is reported by the smallest banks (£4.27 million) and the lowest (£2.28 million) by banks with total assets between £500 million and £1 billion. The ratios of total banking income to total assets, total deposits and total loans ranged between 2 to 5 per cent, which means that total banking income was a small proportion of the mean total sterling amount of bank deposits and bank loans. The mean ratios of total deposits to total loans are higher for smaller sized banks and lower for larger sized banks; the figures indicate that large banks' total mean sterling amount of loans was greater than their total sterling volume of deposits (the opposite was true for smaller sized banks-up to £5 billion in total assets). Finally, the mean figures for ratios TD/L and TL/L (total deposits and total loans per employee), show that the smallest sized banks (total assets not exceeding £500 million) were the most "efficient" with reported ratios of £4.09 million and £3.75 million respectively.

Table A.4. Means of selected ratios for different size categories of banks.

	VARIABLE	0-500m	500m.-2bil.	2bil.-5bil.	5bil.-10bil.	>10bil.
	TA/TD	1.044	1.871	1.4967	2.503	2.2647
	TA/TL	1.137	2.03	1.6747	1.7256	1.7323
W.German	TA/L	4.27 m	3.048 m	2.758 m	4.011 m	3.094 m
	TA/W	42.98	81.52	83.3	156.28	112.85
	Y/TA	0.0445	0.0273	0.0337	0.0199	0.0201
	Y/TD	0.0465	0.0511	0.0504	0.0498	0.0455
banks	Y TL	0.0506	0.0554	0.0564	0.0343	0.0348
	TD TL	1.089	1.0849	1.1189	0.6893	0.7649
	TD/L	4.09 m	1.627 m	1.842 m	1.6021 m	1.366 m
	TL/L	3.75 m	1.5 m	1.647 m	2.324 m	1.786 m
	TA/TD	3.893	4.097	3.987	6.07	3.30
	TA/TL	2.9129	2.8588	2.381	3.05	2.44
French	TA/L	3.262 m	2.603 m	3.037 m	4.04m	4.665m
	TA/W	91.58	85.31	76.19	215.57	95.88
	Y TA	0.0746	0.0926	0.0873	0.0592	0.018
	Y/TD	5.3599	4.74	2.2245	4.303	0.059
	Y TL	133.21	3.54	0.30938	0.167	0.044
banks	TD TL	0.4913	0.6977	0.5721	0.228	0.74
	TD/L	0.8351 m	0.6345 m	0.7613 m	1.2452m	1.361m
	TL/L	1.7037 m	0.909 m	1.33 m	1.6835m	2.016m
	TA/TD	1.6488	1.4439	1.2141	1.6066	1.194
	TA/TL	1.6478	1.7704	2.12	1.9349	1.37
	TA/L	3.125 m	3.283 m	1.476 m	2.289 m	1.325 m
British	TA/W	169.69	155.7	81.83	115.77	78.68
	Y TA	0.008	0.0075	0.0284	0.0057	0.0411
	Y TD	0.0132	0.01	0.0344	0.0092	0.0491
	Y/TL	0.0132	0.013	0.0602	0.0111	0.0564
banks	TD/TL	0.999	1.226	1.746	1.204	1.1477
	TD/L	1.89 m	2.273 m	1.215 m	1.424 m	1.11 m
	TL/L	1.89 m	1.855 m	0.696 m	1.183 m	0.967 m

Notes: Figures for TA/L, TD/L and TL/L are expressed in millions of pounds sterling. TA/TD is the ratio of total assets to total deposits, TA/TL is total assets divided by total loans, TA/L is total assets per employee, TA/W is total assets divided by total personnel expenses, Y/TA, Y/TD and Y/TL are the ratios of total banking income to total assets, total deposits and total loans respectively, TD/TL is the ratio of total deposits to total loans, TD/L is total deposits per employee and TL/L is total loans per employee.

British banks' mean ratios of total assets to total deposits is higher for smaller rather than larger banks which means that larger institutions attract a greater sterling volume of deposits relative to total assets than smaller banks. The lowest ratio (1.19) was reported by the largest size banks, whereas the highest ratio (1.64) was reported by the smallest size banks (those with total assets up to £500 mil.). However, the mean ratio of total assets to total loans is increasing with increases in bank size up to the third biggest size category of banks (those with total assets between £2-£5 bil.) and then decreasing in the two biggest size categories. The mean figures of total assets per employee generally show that small banks have reported much higher figures than large banks, with the lowest figure (£1.32 mil.) reported by the largest banks (total assets exceeding £10 bil.).

The ratios of total banking income to total assets, total deposits and total loans ranged between 1 to 6 per cent, which means that total banking income was a small proportion of the mean total sterling amount of bank deposits and bank loans. The highest ratios of total income to total assets, total deposits and total loans were reached by banks with total assets of £2-£5 billion. The mean ratio of total deposits to total loans is increasing as banks become bigger (up to the third size category) and then decreasing in the last two size categories. Finally, the mean figures for ratios TD/L and TL/L (total deposits and total loans per employee), show that the highest ratios (£2.27 and £1.85 million respectively) were reported by banks with total assets between £500 million-£2 billion (small size banks).

French banks' mean ratios of total assets to total deposits and total loans are higher for smaller rather than larger banks which means that larger institutions attract a greater sterling volume of deposits and loans relative to total assets than smaller banks (the opposite was true for W. German banks). The highest ratios were reported by the second smallest sized banks (4.09 and 2.85 for total assets to total deposits and total loans respectively), whereas the lowest ratios (3.42 and 2.31) for the largest banks (those with total assets in excess of £5 billion). The mean figures of total assets per employee registered one decline and two subsequent increases as the size category of banks increases with the highest figure reported by the largest banks (£4.6 million).

The ratios of total banking income to total assets ranged between 4 to 9 per cent, which means that total banking income was a small proportion of the mean sterling volume of total assets. However, the mean ratios of total income to total deposits and total loans varied widely, reaching a mean maximum of 133.2 and a mean minimum of 0.29. These reported figures seem to suggest that YTD and YTL are decreasing as bank size is increased. The mean ratios of total deposits to total loans are significantly lower than unity for all sizes of banks and range between 0.49 and 0.69, which means that only 49 to 69 per cent of the sterling amount of total deposits is loaned to customers and the remaining funds are put into other investments. Finally, the mean figures for ratios TD/L and TL/L (total deposits and total loans per employee), show that the largest sized banks (total assets exceeding £5 billion) were the most "efficient" with reported ratios £1.36 million and £2.01 million respectively (the opposite was true for the W. German banks where the smallest sized institutions reported the highest ratios; £4.09 million and £3.75 million respectively).

Table A.5 (next page) presents the means of selected profitability measures for the same size categories of banks. Table A.5 indicates that W. German banks' profit rates (measured by the ratios PRY, PRE, PRW, PRL etc.) seem to be not always increasing but decreasing as well as banks become bigger (bank size measured by total assets). The means of gross profits divided by total banking income and total operating expenses (PRY and PRE) are registering subsequent decreases as bank size is increased (up to £2 billion in total assets), followed by two increases in the next two size categories and another decrease in the largest size category.

Table A.5. Means of selected profitability measures for different size categories of banks.

	VARIABLE	0-500m	500m-2bil.	2bil.-5bil.	5bil.-10bil.	>10bil.
	PRY	0.19511	0.08	0.20625	0.22625	0.20738
W.German	PRW	0.53324	0.24775	0.76562	3.0601	0.80015
	PRE	0.22678	0.08725	0.23265	0.33533	0.25104
	PRL	14,659	6,419	22,954	88,230	30,404
	PRTA	0.13208	0.002864	0.00649	0.00359	0.00345
banks	PRTD	0.02868	0.0074	0.01048	0.0244	0.01042
	PRTL	0.01425	0.006371	0.01143	0.00629	0.00863
	YW	2.22	2.21	2.81	3.11	2.27
	YL	55,901	83,280	93,070	79,840	62,250
	PRY	0.19652	0.12404	0.0855	0.076	0.1596
	PRW	1.6664	2.5985	10.898	0.885	0.2766
French	PRE	0.31554	0.18387	0.0947	0.0809	0.1797
	PRL	49,212	106,160	430,580	35,694	17,957
	PRTA	0.01794	0.01074	0.00578	0.0042	0.0028
	PRTD	1.359	1.9393	0.16488	2.3	0.0095
banks	PRTL	43.494	1.6642	0.0201	0.0138	0.007
	YW	7.9252	13.6	72.83	10.3	1.732
	YL	150,050	455,330	1,739,000	345,600	192,000
	YE	1.2352	1.1464	1.0579	1.057	1.125
	PRY	0.1959	0.16164	0.12685	0.0981	0.22844
	PRW	0.98173	1.0147	0.6643	0.61008	1.3528
British	PRE	0.73184	0.2728	0.20846	0.20006	0.45039
	PRL	14,567	29,233	21,685	8,984	22,498
	PRTA	0.01339	0.00731	0.00816	0.00484	0.00829
	PRTD	0.0529	0.01748	0.00992	0.00673	0.011
banks	PRTL	0.09425	0.01592	0.0343	0.01466	0.0176
	YW	0.777	1.7082	2.1917	1.0239	3.7251
	YL	10,554	39,883	61,763	12,500	55,802

Notes: PRY is gross profits divided by total banking income, PRW is gross profits divided by personnel expenses, PRE is gross profits divided by total operating expenses, PRL is gross profits divided by number of employees, PRTA, PRTD and PRTL are gross profits divided by total assets, total deposits and total loans respectively

A somewhat similar trend may be observed for the remaining bank profitability measures, namely gross profits divided by total assets, total deposits, total loans and total personnel expenses and gross profits per employee (as well as total banking income per employee and total income divided by total personnel expenses). As bank size is increased, these profitability measures appear to be considerably affected both negatively and positively. More specifically, gross profits per employee ranged from a mean £2,852 (second size category) to a mean £88,230 (fifth size category). Therefore, the supposition that bank profitability rises with bank size appears not to be holding for this particular sample of banks.

French banks' means of gross profits divided by total banking income and total operating expenses (PRY and PRE) are only registering subsequent decreases as bank size is increased; the highest ratios (0.19 and 0.31) are reported by the smallest banks in the sample (total assets up to £500 million). The same trend may be observed for the profitability measures PRTA and PRTL (gross profits divided by total assets and total loans respectively). The remaining bank profitability measures, namely gross profits divided by total deposits, total personnel expenses and number of employees (as well as the total banking income performance measures) registered both increases and decreases as bank size is increased. More specifically, gross profits per employee ranged from a mean £17,957 reported by the largest banks to a mean £430,580 reported by the second largest bank category. Therefore, it seems that bank profitability does not increase with bank size; on the contrary bank profitability seems to be consistently decreasing as bank size increases when profitability is measured by the ratios PRY, PRE, PRTA and PRTL.

British banks' means of gross profits divided by total banking income, total operating expenses and total deposits (PRY, PRE and PRTD) are registering subsequent decreases as bank size is increased (up to £10 billion in total assets), followed by one increases in the last size category (largest banks inthe sample-total assets exceeding £10 billion). A somewhat similar trend may be observed for the remaining bank profitability measures, namely gross profits divided by total assets, total loans and total personnel expenses and gross profits per employee (as well as total banking income per employee and total income divided by total personnel expenses). As bank size is increased, these profitability measures either rise or decline. More specifically, gross profits per employee ranged from a mean £8,984 (fourth largest size category) to a mean £29,233 (second largest size category). Hence, these findings seem to confirm our earlier conclusions about the relationship between bank profitability and size; the contention that banking profitability is increasing with bank size is doubtful.

Table A.6. Means of market share variables for different size categories of W. German, French and British banks.

	VARIABLE	0-500mil.	500m-2bil.	2bil.-5bil.	5bil.-10bil.	>10bil.
	STBS	0.00045	0.0019	0.00304	0.00365	0.01702
W.German	SS	0.000014	0.000074	0.000132	0.00118	0.00282
	SBL	0.000045	0.000307	0.000623	0.0061	0.0219
	SACI	0.000229	0.000627	0.00206	0.0038	0.01968
banks	SLCI	0.000219	0.000632	0.000818	0.00325	0.01489
	STA	0.000191	0.000752	0.00164	0.00474	0.0222
	STD	0.000397	0.000871	0.00238	0.0041	0.0212
	STL	0.000329	0.000725	0.00192	0.00538	0.025
	STBS	0.000723	0.00223	0.00348	0.0207	0.0329
	SS	0.000171	0.00276	0.0062	0.0112	0.0146
French	SACI	0.00024	0.000807	0.00127	0.0024	0.0871
	SLCI	0.000267	0.00103	0.00216	0.0047	0.103
	SCDS	0.000039	0.000325	0.000195	0.0012	0.009
banks	STA	0.000253	0.00117	0.00289	0.0052	0.0879
	STD	0.000193	0.000854	0.00216	0.0018	0.0794
	STL	0.000174	0.00116	0.00358	0.0062	0.101
	SCDS	0.000118	0.000062	0.00033	0.00139	0.00458
	SACI	0.000189	0.00032	0.00177	0.00326	0.00433
British	SLCI	0.000213	0.000577	0.000117	0.000046	0.00041
	SS	0.000282	0.000636	0.00435	0.01385	0.04949
	STBS	0.000026	0.000526	0.0118	0.000115	0.06465
banks	STA	0.000221	0.000878	0.00257	0.00561	0.03722
	STD	0.000145	0.00066	0.0023	0.00379	0.03383
	STL	0.000174	0.000646	0.00158	0.00377	0.03537

Notes: STBS is the share of T-Bills variable, SS is the share of total securities, SBL is the share of total bonds, SACI is the share of total assets from other credit institutions, SLCI is the share of total liabilities owed to other credit institutions and STA, STD and STL are the shares of total deposits and total loans respectively.

W.German and French banks' means of the share variables presented in Table A.6 are continuously increasing as bank size rises, which simply means that larger banks are more heavily involved in all asset and liability categories than smaller banks; in other words larger banks attract a higher total sterling amount of deposits and lend a bigger total sterling amount of loans than smaller banks (those belonging in the immediate previous size category).

Moreover, British banks' means of the share variables presented in Table A.6 are continuously increasing as bank size rises as is the case for W.German and French banks, although share variables SLCI and STBS are registering decreases as well as bank size is increased.

1.2 Market structure and interest rates.

1.2.1 Variable description.

Table A.7 presents descriptive statistics for some of the variables involved in our empirical estimations (market structure and interest rate variability). Table A.7 indicates that W. German banks' mean net interest income reached £71.4 million, with a minimum of £-231.1 million and a maximum of £1,675 million. The mean of net commission income was £38.0 million, with a minimum value of £-0.95 million and a maximum of £817.8 million. The mean of total assets (TA) rose to £8,016 million, with a minimum of £11.1 million and a maximum of £88,764 million. Moreover, the mean of total deposits was £3,688 million, with a minimum of £22.9 million and a maximum of £49,054 miliion and the mean of total loans was £4,623 million, with a minimum of £74.5 million and a maximum of £48,269 million.

Table A.7 .Descriptive statistics of the net interest income variable and net commission income variables of W. German, British and French banks (1990).

	VARIABLE	MEAN	STAN. DEV.	VARIANCE	MINIMUM	MAXIMUM
	I	71,412	229,460	52,654E+09	-231,140	1,675,400
W.German	C	38,085	118,690	14,088E+09	-951	817,880
	TA	8,016,500	16,125,000	26,000E+13	11,176	88,746,000
banks	TD	3,688,400	8,382,500	70,266E+12	22,901	49,054,000
	TL	4,623,500	9,685,100	93,801E+12	74,520	48,269,000
	I	283,400	788,030	620,990E+09	0	3,600,000
British	C	10,998	42,424	17,998E+08	0	285,000
	TA	12,582,000	26,990,000	72,845E+13	114,430	135,000,000
banks	TD	10,237,000	23,123,000	53,465E+13	41,384	111,000,000
	TL	8,693,700	20,388,000	41,567E+13	17,683	97,749,000
	I	106,670	264,180	69,789E+09	-100,530	1,649,200
French	C	2,483	7,119	50,693E+06	-19,189	31,635
	TA	7,037,300	16,535,000	27,341E+13	137,410	102,000,000
banks	TD	2,008,900	6,333,800	40,117E+12	1,077	30,891,000
	TL	3,023,800	7,653,000	58,568E+12	29	41,710,000

Notes: The figures for variables I, C, TA, TD, and TL are expressed in thousands of pounds sterling. I is net interest income, C is net commission income, TA is total assets, TD is total deposits, TL is total loans.

British banks' mean net interest income reached £283.4 million (much higher than the £71.4 million mean observed by W. German banks), with a minimum value of zero and a maximum of £3,600 million. The mean of net commission income was £10.9 million (much lower than the £38.0 million mean figure reported by their W. German counterparts), with a minimum value of zero and a maximum of £285.0 million. The mean of total assets (TA) rose to £12,582 million (in comparison with £8,016 million mean total assets of W. German banks), with a minimum of £114.4 million and a maximum of £135,000 million. Moreover, the mean of total deposits was £10,237 million, with a minimum of £41.3 million and a maximum of £111,000 miliion and the mean of total loans was £8,693 million, with a minimum of £17.6 million and a maximum of £97,749 million. Hence, British banks were on average larger than W. German banks.

French banks' mean net interest income reached £106.6 million (in comparison with £283.4 million and £71.4 million observed by British and W. German banks respectively), with a minimum value of £-100.5 million and a maximum of £1,649 million. The mean of net commission income was £2.4 million (much lower than the £38.0 million mean figure reported by their W. German counterparts, and the £10.9 million reported by British banks), with a minimum value of £-19.1 million and a maximum of £31.6 million. The mean of total assets (TA) rose to £7,037 million (in comparison with £8,016 million and £12,582 million mean total assets of W. German and British banks respectively), with a minimum of £137.4 million and a maximum of £102,000 million. Moreover, the mean of total deposits was £2,008 million, with a minimum of £1.0 million and a maximum of £30,891 miliion and the mean of total loans was £3,023 million, with a minimum of £29 thousand and a maximum of £41,710 million. Therefore, the British banks included in our sample were on average larger than both W. German and French banks, with the French banking institutions being the smallest.

The following table (Table A.8) shows the means of selected variables for different size categories of banks. These figures suggest that W. German bank's mean net commission income, mean total banking income, mean total operating expenses and mean total personnel expenses rose as the size of the bank (measured by total assets) increased. Total banking income ranged from a mean £15.5 million for the smallest size category to a mean £813.1 million for the largest size category, whereas mean operating expenses reached £698.5 million for the largest banks in the sample (£14 million for the smallest banks). However, mean figures for net interest income firstly registered two subsequent decreases and then increases as banks grew bigger (going from one size category to another); mean net interest income reached a low of £5.8 million and a high of £357.2 million (largest banks in the sample).

TABLE A.8. Means of selected variables for different size categories of W. German, British and French banks (1990).

	VARIABLE	0-500m	500m.-2bil.	2bil.-5bil.	5bil.-10bil.	>10bil.
	I	6,967	5,889	42,675	64,909	357,210
W.German	C	2,445	7,971	16,214	30,924	201,110
	E	14,018	34,718	92,943	274,260	698,560
banks	Y	15,553	37,403	101,020	171,930	813,110
	W	8,121	16,869	35,947	55,267	358,160
	L	81.6	449.1	1085.4	2153.3	13,060
	I	2,016	6,518	40,411	33,762	1,212,400
British	C	56	467	1,540	4,207	44,818
	E	1,026	5,328	75,011	22,263	1,642,100
banks	Y	2,251	8,421	92,809	41,125	1,946,800
	W	1,656	7,163	39,924	61,544	600,850
	L	89.9	339.6	2,212.4	3,111.8	35,657
	I	7,049	16,627	60,346	198,850	164,920
French	C	214	641	5,097	6,869	19,189
	E	17,960	125,260	276,910	542,910	1,637,400
banks	Y	21,589	132,710	289,720	568,820	1,843,300
	W	3,207	15,971	44,045	91,936	1,063,800
	L	89.8	523.2	1,104.6	4,594	56,835

Notes: All figures are expressed in thousands of pounds sterling except those of variable L. I is net interest income, C is net commission income, E is total operating expenses, Y is total banking income, W is total personnel expenses, L is number of employees.

British bank's mean net interest income, mean total banking income, mean total operating expenses rose as the size of the bank (measured by total assets) increased, with one exception of a recorded decline (banks with total assets between £5-£10 billion). Total banking income ranged from a mean £2.2 million for the smallest size category to a mean £1.9 billion for the largest size category, whereas the mean net interest income reached £1.2 billion for the largest banks in the sample (£2 million for the smallest banks). Moreever, mean figures for variables net commission income and total personnel expenses consistently registered subsequent increases as banks became bigger (going from one size category to another); mean net commission income reached a low of £56 thousand and a high of £44.8 million (largest banks in the sample).

French bank's mean net interest income, mean total banking income, mean total operating expenses and mean total personnel expenses rose as the size of the bank (measured by total assets) increased. Total banking income ranged from a mean £21.5 million for the smallest size category to a mean £675 million for the largest size category, whereas the mean total operating expenses reached £634.1 million for the largest banks in the sample (£17.9 million for the smallest banks). However, mean figures for variable net commission income firstly registered two subsequent increases and then a decrease (biggest size banks) as banks become bigger (going from one size category to another); mean net commission income reached a low of £214 thousand and a high of £5 million (for banks with total assets between £2-£5 billion).

Table A.9 shows that W. German bank's mean gross profits and mean net profits rose as the size of the bank (measured by total assets) increased, with one recorded decline for the second size category. Mean gross profits ranged between £2.3 million and £193.1 million (for the largest size category). The mean ratio of net interest income to net commission income shows both increases and decreases as bank size rises and ranges between 0.73 and 2.84 (reported by the smallest size category).

The mean ratios of net commission income to total banking income and total operating expenses are generally lower for smaller banks rather than larger banks, which means that a greater percentage of larger banks' total income comes from net commission income in comparison with small size banks; the two ratios range between 10 and 18 per cent. Moreover, the mean ratios of net commission income to gross and net profits seem to be both increasing and decreasing as bank size is increased. The highest mean ratios (1.97 and 3.82 for net commission income to gross and net profits respectively) were reported by the third biggest size category of banks (those with total assets between £1 and £2 billion).

TABLE A.9. Means of selected ratios for different size categories of banks.

	VARIABLE	0-500m	500m-2bil.	2bil.-5bil.	5bil.-10bil.	>10bil.
	PRGROSS	3,363	4,042	19,245	30,628	193,170
W.German	PRNET	1,534	2,084	7,955	17,149	114,550
	I/C	2.849	0.7388	2.6319	2.0989	1.7761
	C/Y	0.1069	0.1357	0.1532	0.1499	0.1526
	C/E	0.1185	0.1456	0.167	0.1506	0.1822
banks	C/L	4,806	18,335	10,965	13,817	14,649
	C/PRGROSS	0.727	1.9719	0.8425	1.0096	1.0411
	C/PRNET	1.593	3.8233	2.038	1.8032	1.7556
	PRGROSS	3,029	8,197	28,406	27,934	301,240
British	PRNET	3,160	6,354	21,298	19,700	163,580
	I/C	2.1357	2.1361	1.217	10.427	2.9737
	C/Y	0.00435	0.02	0.01881	0.03519	0.06454
	C/E	0.00694	0.03239	0.0336	0.07624	0.12369
banks	C/L	459	857	962	1,323	4,628
	C/PRGROSS	0.0185	0.0569	0.0542	0.1406	0.1487
	C/PRNET	0.0177	0.0735	0.0723	0.2135	0.2739
	PRGROSS	4,905	10,591	19,360	26,791	294,230
French	PRNET	3,628	7,451	12,811	18,457	205,920
	I/C	32.85	25.92	11.83	13.82	68.04
	C/Y	0.01986	0.00653	0.02879	0.012	0.0102
	C/E	0.02384	0.0071	0.02974	0.012	0.0105
banks	C/L	2,238	1,490	2,138	1.892	2,324
	C/PRGROSS	0.0437	0.0605	0.2633	0.2593	0.0767
	C/PRNET	0.0591	0.086	0.3979	0.5616	0.1154

Notes: Figures for variables PRGROSS and PRNET are expressed in thousands of pounds sterling. PRGROSS is gross profits, PRNET is net profits, I/C is the ratio of net interest income to net commission income, C/Y, C/E, C/PRGROSS and C/PRNET are the ratios of net commission income to total income, total operating expenses, gross profits and net profits respectively and C/L is net commission income per employee.

British banks' mean gross and net profits are increasing as the size of the bank rises (with one exception being the second largest category of banks which suffered decreased profits). British banks' reported mean gross profits that ranged between £3 million and £301.2 million, whereas mean net profits ranged between £3.1 million and £163.5 million. The mean ratio of net interest income to net commission income shows both increases and decreases as bank size rises and ranges between 1.2 and 10.4 (reported by banks with total assets of £5-£10 billion).

The mean ratios of net commission income to total banking income and total operating expenses (C/Y and C/E) are generally lower for smaller banks rather than larger banks, which means that a greater percentage of larger banks' total income comes from net commission income in comparison with small size banks; the two ratios range between 0.4 and 12 per cent. Moreover, the mean ratios of net commission income to gross and net profits seem to be both increasing (with the exception of one decline) as bank size is increased. The highest mean ratios (0.14 and 0.27 for net commission income to gross and net profits respectively) were reported by the biggest size category of banks.

French banks' gross profits and net profits are increasing as the size of the banks increases. Mean bank gross profits ranged between £4.9 million (smallest size category) and £61.2 million (largest size category), whereas mean net profits ranged between £3.6 and £40.6 million. The mean ratio of net interest income to net commission income shows both increases and decreases as bank size rises and ranges between 11.83 and 68.04 (reported by the largest size banks).

The mean ratios of net commission income to total banking income, total operating expenses and number of employees (C/Y, C/E and C/L) seem to be decreasing, then increasing and finally decreasing again as bank size is increased. Mean ratios for net commission income per employee reached a minimum £1,490 and a maximum £2,238 (smallest category of banks). Moreover, the mean ratios of net commission income to gross and net profits seem to be both increasing (with the exception of one decline for the biggest sized banks) as bank size is increased. The highest mean ratios (0.26 and 0.39 for net commission income to gross and net profits respectively) were reported by the second biggest size category of banks (those with total assets between £2-£5 billion).

Table A.10 (next page) indicates that W.German banks' mean ratios of net interest income to total income, total operating expenses and total personnel expenses are initially decreasing as bank size rises, then increasing for banks with total assets between £2 and £10 billion and finally decreasing for the largest size banks in the sample. The lowest ratios were reported by the biggest size banks and ranged between 14 and 51 per cent (for ratios I/Y and I/W respectively), which means that big banks have reported lower net interest income accounts relative to total income and total personnel expenses than smaller institutions.

A somewhat similar trend may be observed for the mean ratios of net interest income to total assets, total deposits and total loans; these ratios are registering both increases and decreases as banks become bigger. The lowest ratios are once again generally reported by the large rather than the small banks. The largest size banks reported ratios of less than half a percentage point. Moreover, the mean figures for ratios I/PRGROSS and I/PRNET (net interest income to gross and net profits) indicate that both ratios are initially increasing and then decreasing as bank size is increased; net interest income revenue is between 1.42 and 10.26 times higher than W. German banks gross and net profits. Moreover, net interest income per employee reached a maximum of £76,447 and a minimum of £12,591.

British banks' mean ratios of net interest income to total income, total operating expenses, total personnel expenses, gross profits and net profits appear to be both decreasing and increasing as bank size rises and therefore we may not distinguish a consistent trend in relation to the behaviour of these ratios with changes in bank size. The means of ratios I/Y, I/W and I/E ranged between 0.20 and 1.34, whereas the means of ratios net interest income to gross and net profits ranged between 0.48 and 15.88. Furthermore, the highest net interest income to gross and net profits ratios (15.88 and 3.36 respectively) were reported by the biggest size category banks.

Table A.10. Means of selected net interest income ratios of banks.

	VARIABLE	0-500m	500m-2bil.	2bil.-5bil.	5bil.-10bil.	>10bil.
	I/Y	0.3379	0.1596	0.3762	0.4005	0.1443
W.German	I/W	0.8384	0.5575	0.9923	2.8931	0.5134
	I/E	0.3748	0.1756	0.4138	0.4566	0.2031
	I/L	16,881	14,315	21,269	76,447	18,105
	I/TA	0.03362	0.00438	0.01392	0.00791	0.00443
	I/TD	0.02302	0.00855	0.02094	0.04056	0.00149
banks	I/TL	0.01901	0.00484	0.02301	0.01465	0.00478
	I/PRGROSS	1.5781	1.4241	2.1574	2.0583	1.8492
	I/PRNET	3.9476	10.264	5.3	4.0224	3.1183
	I/Y	0.26126	0.32436	0.29188	0.20419	0.56834
	I/W	0.69087	1.2558	1.3422	0.83764	2.6772
British	I/E	0.91581	0.53298	0.44171	0.39613	0.94181
	I/L	9,820	27,692	32,039	10,257	39,813
	I/TA	0.00901	0.00676	0.01312	0.00445	0.02077
	I/TD	0.0106	0.00891	0.01533	0.00592	0.02486
banks	I/TL	0.02782	0.01348	0.0306	0.00541	0.02708
	I/PRGROSS	0.48131	0.93074	1.838	0.61685	15.88
	I/PRNET	0.74379	1.3063	2.4064	0.82431	3.3624
	I/Y	0.42255	0.3056	0.38691	0.3847	0.4272
	I/W	2.3031	1.9642	15.33	11.54	10.71
French	I/E	0.54834	0.36753	0.41128	0.4077	0.4576
	I/L	65,378	66,607	98,214	58,148	74,820
	I/TA	0.02639	0.01674	0.019	0.0165	0.0132
	I/TD	0.0934	0.05	0.0717	0.998	0.051
banks	I/TL	0.0459	0.0348	0.041	0.11	0.0345
	I/PRGROSS	0.77346	1.5699	3.117	7.968	5.222
	I/PRNET	1.94	2.2315	4.7104	9.827	7.857

Notes: I/Y, I/W, I/E, I/PRGROSS and I/PRNET are the ratios of net interest income to total banking income, total personnel expenses, total operating expenses, gross profits and net profits respectively, I/TA, I/TD and I/TL are the ratios of net interest income to total assets, total deposits and total loans respectively and I/L is net interest income per employee.

A very similar trend may be observed to be developing for the mean ratios of net interest income to total assets, total deposits and total loans; these ratios are registering both increases and decreases as banks become bigger. These mean ratios ranged between 0.4 and 3 per cent, which means that net interest income represents only a very small proportion of British banks' total assets, total deposits and/or total loans. Moreover, net interest income per employee reached a mean maximum £39,813 (largest size banks) and a mean minimum £9,820.

French banks' mean ratios of net interest income to total income, total operating expenses and total personnel expenses appear to be both decreasing and increasing as bank size rises and therefore we may not distinguish a consistent trend in relation to the behaviour of these ratios with changes in bank size.

The mean figures for net interest income per employee are increasing as bank size increases, but decreasing in the largest size banks, which report the lowest mean net interest income per employee figures (£58,148). Furthermore, the mean ratios of net interest income to gross and net profits are continuously increasing as banks become bigger; thus, the highest ratios (5.22 and 7.85 for I/PRGROSS and I/PRNET respectively) are reported by the largest category of banks. A somewhat similar trend may be observed to be developing for the mean ratios of net interest income to total assets, total deposits and total loans; these ratios are registering mostly increases (and a few decreases as well) as banks become bigger. These mean ratios ranged between 1.6 and 9.3 per cent, which means that net interest income represents only a small proportion of British banks' total assets, total deposits and/or total loans.

1.3 Diagnostic tests for the empirical estimations presented in Chapter 5.

Notes for Table 5.2. Diagnostic tests were carried out to see whether heteroscedasticity is present. The χ^2 values for the B-P-G, Harvey and Glejser tests are:
W. German sample: $\chi^2 = 11.69$ with 8 degrees of freedom (DF; B-P-G test), $\chi^2 = 9.84$ with 8 DF (Harvey test) and $\chi^2 = 14.92$ with 8 DF (Glejser test).
French sample: $\chi^2 = 6.89$ with 8 DF (B-P-G test), $\chi^2 = 4.12$ with 8 DF (Harvey test) and $\chi^2 - 12.35$ with 8 DF (Glejser test)
British sample: $\chi^2 = 12.26$ with 8 DF (B-P-G test), $\chi^2 = 6.11$ with 8 DF (Harvey test) and $\chi^2 = 12.66$ with 8 DF (Glejser test)
These values do not exceed $\chi^2_{0.95}$ (8 DF) = 15.507 and therefore the null hypothesis holds, and homoscedasticity is present.

Notes for Table 5.3. The χ^2 values for the B-P-G, Harvey and Glejser tests are:
W. German sample: $\chi^2 = 8.08$ with 8 DF (B-P-G test), $\chi^2 = 6.68$ with 8 DF (Harvey test) and $\chi^2 - 9.24$ with 8 DF (Glejser test).
French sample: $\chi^2 - 5.14$ with 8 DF (B-P-G test), $\chi^2 = 2.77$ with 8 DF (Harvey test) and $\chi^2 - 6.92$ with 8 DF (Glejser test)
British sample: $\chi^2 = 4.18$ with 8 DF (B-P-G test), $\chi^2 = 3.54$ with 8 DF (Harvey test) and χ^2 6.74 with 8 DF (Glejser test)
These values do not exceed $\chi^2_{0.95}$ (8 DF) = 15.507 and therefore the null hypothesis holds, and homoscedasticity is present.

Notes for Table 5.4. The χ^2 values for the B-P-G, Harvey and Glejser tests are:
W. German sample: $\chi^2 = 6.86$ with 8 DF (B-P-G test), $\chi^2 = 4.6$ with 8 DF (Harvey test) and $\chi^2 = 10.03$ with 8 DF (Glejser test).
French sample: $\chi^2 = 4.97$ with 8 DF (B-P-G test), $\chi^2 = 2.25$ with 8 DF (Harvey test) and $\chi^2 - 8.63$ with 8 DF (Glejser test)
British sample: $\chi^2 = 1.68$ with 8 DF (B-P-G test), $\chi^2 = 1.19$ with 8 DF (Harvey test) and $\chi^2 = 2.42$ with 8 DF (Glejser test)
These values do not exceed $\chi^2_{0.95}$ (8 DF) = 15.507 and therefore the null hypothesis holds, and homoscedasticity is present.

Notes for Table 5.5. The χ^2 values for the B-P-G, Harvey and Glejser tests are:
W. German sample: $\chi^2 = 3.56$ with 9 DF (B-P-G test), $\chi^2 = 3.28$ with 9 DF (Harvey test) and χ^2 6.97 with 9 DF (Glejser test).
French sample: $\chi^2 = 4.38$ with 9 DF (B-P-G test), $\chi^2 = 2.85$ with 9 DF (Harvey test) and χ^2 − 9.47 with 9 DF (Glejser test).
British sample: $\chi^2 = 2.62$ with 9 DF (B-P-G test), $\chi^2 = 2.14$ with 9 DF (Harvey test) and $\chi^2 = 8.82$ with 9 DF (Glejser test).
These values do not exceed $\chi^2_{0.95}$ (9 DF) = 16.91 and therefore the null hypothesis holds, and homoscedasticity is present.

Notes for Table 5.6. The χ^2 values for the B-P-G, Harvey and Glejser tests are: All-country sample: χ^2 6.93 with 10 DF (B-P-G test), $\chi^2 = 3.71$ with 10 DF (Harvey test) and $\chi^2 = 14.69$ with 10 DF (Glejser test).
These values do not exceed $\chi^2_{0.95}$ (10 DF) = 18.307 and therefore the null hypothesis holds, and homoscedasticity is present.

Notes for Table 5.7. The χ^2 values for the B-P-G, Harvey and Glejser tests are: All-country sample: $\chi^2 = 3.89$ with 10 DF (B-P-G test), $\chi^2 = 3.05$ with 10 DF (Harvey test) and $\chi^2 = 16.61$ with 10 DF (Glejser test).
These values do not exceed $\chi^2_{0.95}$ (10 DF) = 18.307 and therefore the null hypothesis holds, and homoscedasticity is present.

Notes for Table 5.8. The χ^2 values for the B-P-G, Harvey and Glejser tests are: All-country sample: χ^2 − 8.03 with 10 DF (B-P-G test), $\chi^2 = 10.88$ with 10 DF (Harvey test) and $\chi^2 = 15.49$ with 10 DF (Glejser test).
These values do not exceed $\chi^2_{0.95}$ (10 DF) = 18.307 and therefore the null hypothesis holds, and homoscedasticity is present.

1.4 Additional empirical estimations.

The following table presents the empirical results of estimating our model (equation 30), while replacing gross profits with net profits divided by personnel expenses.

Table A.11 The impact of market structure on banks' net profit rates (net profits/personnel expenses).

Variable name	W. Germany	France	U.K
	Estimated coefficients (t-statistics in parentheses)		
STBS	-357.24 (-2.04[b])	-27.262 (-0.381)	-1.0523 (-0.186)
SS	-880.62 (-1.404[a])	426.29 (2.536[c])	0.4342 (0.092)
SBL	277.21 (1.35[a])	-133.21 (-0.744)	-11.966 (-1.069)
SACI	131.27 (0.679)	1277.9 (1.386[a])	-5.8207 (-0.163)
SLCI	-117.73 (-0.395)	-1194.1 (-1.328[a])	617.06 (3.741[c])
STD	605.46 (1.452[a])	-197.37 (-0.349)	-101.76 (-1.059)
STL	-454.42 (-1.119)	196.94 (0.32)	93.4 (1.107)
TAINV	-11925000 (0.286)	-136160000 (-0.193)	-14562000 (-0.244)
Constant	1.065 (1.86[b])	2.0443 (0.956)	0.7111 (3.865[c])

Notes: The superscripts a and b denote significant coefficients at the 10 and 5 percent levels respectively. R-square adjusted = 0.2282 for the W. German sample, 0.1833 for the French sample and 0.122 for the British sample.

The χ^2 values for the B-P-G, Harvey and Glejser tests are:

W. German sample: χ^2 = 6.75 with 8 DF (B-P-G test), χ^2 = 4.29 with 8 DF (Harvey test) and χ^2 = 8.93 with 8 DF (Glejser test).

French sample: χ^2 = 4.91 with 8 DF (B-P-G test), χ^2 = 2.94 with 8 DF (Harvey test) and χ^2 = 15.07 with 8 DF (Glejser test)
British sample: χ^2 = 5.56 with 8 DF (B-P-G test), χ^2 = 4.5 with 8 DF (Harvey test) and χ^2 = 12.22 with 8 DF (Glejser test)
These values do not exceed $\chi^2_{0.95}$ (8 DF) = 15.507 and therefore the null hypothesis holds, and homoscedasticity is present.

The empirical findings of Table A.11 confirm the empirical results reported in Chapter 5. The shares of total deposits and total loans (W. German sample) have a positive and negative sign respectively, but only STD is statistically significantly affecting total net profit rates. In the French sample, three share variables out of a total of seven are found to be statistically significant (a marked improvement from earlier findings), with two variables positively affecting and one variable negatively affecting profitability. The shares of total deposits and total loans fail to show any impact in the determination of the dependent variable. Finally, the British results indicate that only one share variable (SLCI) is statistically affecting bank profits (in agreement with earlier findings); SLCI has a positive sign. The adjusted R-square is relatively low explaining between 12 and 22 per cent of the variability in net profit rates.

In another attempt at sheding more light on the structure-performance relationship, we replaced the net profitability dependent variable with another performance measure, namely, gross profits divided by total operating expenses (Table A.12). These results indicate that the performance of the dependent variable gross profits divided by operating expenses is very similar with the performance of the other dependent variables used in earlier estimations. The shares of total deposits and total loans (W. German sample) once again display a positive and negative sign respectively, but STD is not statistically significant in contrast to earlier findings. In relation to the independent share variables only STBS, SS and SACI are found to be significant estimators of gross banking profitability (only SACI has the correct positive sign). The size variable TAINV is statistically insignificant and has the correct negative sign in accordance with all previous estimations. As regards the French and British results no independent share variable is found to be statistically significant. Moreover, from the 14 share variables, 8 have negative signs and 6 have positive signs (in accordance with previous findings).

Table A.12 The impact of market structure on banks' gross profit rates (gross profits/total operating expenses).

Variable name	W. Germany	France	U.K
	Estimated coefficients (t-statistics in parentheses)		
STBS	-29.412 (-2.747[c])	-0.1969 (-0.068)	-3.8011 (-0.796)
SS	-67.099 (-2.555[c])	-2.3955 (-0.353)	1.2524 (0.316)
SBL	10.725 (0.848)	0.9096 (0.126)	-5.1183 (-0.54)
SACI	19.139 (1.585[a])	-13.234 (-0.356)	-13.051 (-0.433)
SLCI	-17.814 (-1.018)	13.331 (0.395)	102.94 (0.737)
STD	24.912 (0.976)	8.3499 (0.366)	-43.501 (-0.535)
STL	-4.7319 (-0.175)	-7.8945 (-0.318)	49.917 (0.699)
TAINV	-507800 (-0.191)	55346000 (1.949[b])	179410000 (3.562[c])
Constant	0.24169 (7.101[c])	0.1101 (1.277)	0.1663 (1.068)

Notes: The superscripts a and c denote significant coefficients at the 10 and 1 percent levels respectively. R-square adjusted = 0.1716 for the W. German sample, 0.155 for the French sample and 0.1683 for the British sample.

The χ^2 values for the B-P-G, Harvey and Glejser tests are:

W. German sample: $\chi^2 = 7.44$ with 8 DF (B-P-G test), $\chi^2 = 6.33$ with 8 DF (Harvey test) and $\chi^2 - 10.23$ with 8 DF (Glejser test).

French sample: χ^2 = 3.64 with 8 DF (B-P-G test), χ^2 = 2.92 with 8 DF (Harvey test) and χ^2 = 7.67 with 8 DF (Glejser test)
British sample: χ^2 = 3.65 with 8 DF (B-P-G test), χ^2 = 2.43 with 8 DF (Harvey test) and χ^2 = 5.53 with 8 DF (Glejser test)
These values do not exceed $\chi^2_{0.95}$ (8 DF) = 15.507 and therefore the null hypothesis holds, and homoscedasticity is present.

Furthermore, in another similar estimation, we replaced the gross profits dependent variable with net profits (leaving everything else intact). The results of this estimation agree with the empirical findings presented in the previous table. The share variables of total deposits and total loans are both statistically insignificant and retain the signs they had in Table A.12 (positive and negative respectively).

APPENDIX 2.

DESCRIPTIVE STATISTICS OF BANK COST AND OUTPUT VARIABLES.

2.1 Variation of cost and output variables.

The W.German sample consists of 76 banks, the British sample 50 banks and the French sample 43 banks. The following table (Table B.1) presents descriptive statistics for cost, output and input variables.

Table B.1. Descriptive statistics of input, output and cost variables of W. German, French and British banks (1990).

	VARIABLE	MEAN	STAN. DEV.	VARIANCE	MINIMUM	MAXIMUM
	E	189,400	394,960	15,599E+10	7,872	1,943,300
W. German	TL	5,857,900	11,089,000	12,297E+13	74,520	48,269,000
	TL/L	5,330	10,818	11,704E+07	440	60,777
	WL	32,046	12,743	162,390,000	8,934	72,196
banks	R	9,507	22,593	51,043E+07	244	111,790
	L	3,418	8,702	75,741,000	53	52,272
	S	164,350	475,330	22,594E+10	0	2,212,000
	E	235,520	337,400	11,384E+10	3,383	1,637,400
French	TL	3,215,700	8,456,100	71,505E+12	29	41,710,000
	TL/L	8,576	38,523	14,841E+08	0	222,630
	WL	34,372	9,130	83,365,000	16,638	74,125
banks	R	6,588	15,099	22,799E+07	56	86,970
	L	2,145	5,990	35,887,000	12	34,496
	S	156,990	274,300	75,238E+09	0	1,052,200
	E	506,030	1,379,600	19,032E+18	1,000	7,490,000
British	TL	8,690,400	20,384,000	41,552E+20	17,700	97,700,000
	TL/L	1,734	17,805	31,703E+12	1,144	7,185
	WL	25,088	17,371	30,174E+08	7,330	93,385
banks	R	24,082	54,249	29,430E+15	6,182	253,000
	L	9,067	21,592	46,320E+08	40	95,359
	S	750,670	1,866,500	34,819E+18	96,460	10,300,000

Notes: The above figures are expressed in thousands of pounds sterling except those of variables WL and L. E is total operating expenses, TL is total loans, TL/L is total loans per employee, WL is average employee earnings, R is capital depreciation, S is total securities and L is number of employees.

Table B.1 indicates that W. German banks' mean total operating expenses rose to £189.4 million, with a minimum of £7.8 million and a maximum of £1,943 million. The banks' mean of total loans reached £5,857 million, with a minimum of £74.5 million and a maximum of £48,269 million. Moreover, the mean figure of total loans per employee was £5.3 million, with a minimum of £440 thousand and a maximum of £60.7 million. In relation to the input variables WL and R, their recorded means were £32 thousand and £9.5 million respectively, with minimum values of £8,934 and £244 thousand and maximum values of £72,196 and £111.7 million respectively. Finally, W. German banks on average employed 3,418 employees, with a minimum of 53 and a maximum of 52,272 employees.

French banks' mean total operating expenses rose to £235.5 million (in comparison with £189.4 million and £506 million for W. German banks and British banks respectively), with a minimum of £3.3 million and a maximum of £1,637 million. The banks' mean of total loans reached £3,215 million (much lower than the corresponding figure of £5,857 million and £8,690 million loaned by W. German and British banks respectively), with a minimum of £29 thousand and a maximum of £41,710 million. Furthermore, the mean figure of total loans per employee was £8.5 million (compared with £5.3 million for W. German banks and £1.7 million for British banks), with a minimum value of zero and a maximum of £222 million. The mean figures for input variables WL and R, rose to £34 thousand and £6.5 million respectively, with minimum values of £16,638 and £56.5 thousand and maximum values of £74,125 and £86.9 million respectively. Finally, French banks on average employed 2,145 employees (compared with 3,418 and 9,067 employed by W. German and British banks respectively), with a minimum of 12 and a maximum of 34,496 employees.

The following table (Table B.2) shows the means of selected variables for different size categories of banks.

TABLE B.2. Means of input, output and cost variables for different size categories of banks

	VARIABLE	0-500m	500mil.-2bil	2bil.-5bil.	5bil.-10bil.	>10bil.
W. German banks	E	14,018	34,718 (147.6%)	92,943 (167.7%)	274,260 (195%)	698,560 (154.7%)
	TL	306,850	674,620 (119.8%)	1,788,000 (165%)	5,005,100 (179.9%)	23,332,000 (366.1%)
	TL/L	3,760	1,502 (-60.05%)	1,647 (9.65%)	2,324 (41.1%)	1,786 (-23.1%)
	WL	26,074	27,692 (6.2%)	25,404 (-8.26%)	22,674 (-10.7%)	36,097 (59.19%)
	R	814	2,083 (155.9%)	4,841 (132.4%)	6,081 (25.61%)	35,697 (487%)
	L	81.6	449.1 (554.3%)	1085.4 (141.6%)	2153.3 (98.43%)	13,060 (506.5%)
	S	3,096	15,682 (506.5%)	27,888 (77.83%)	250,540 (798.3%)	596,940 (138.2%)
French banks	E	17,960	125,260 (597.4%)	276,910 (121%)	346,750 (25.22%)	839,380 (142.07%)
	TL	153,570	476,590 (210.34%)	1,470,800 (208.6%)	2,558,000 (74.01%)	14,540,000 (568.41%)
	TL/L	1,712	910 (-46.84%)	1,331 (46.26%)	2,538 (90.68%)	15,845 (624.31%)
	WL	22,098	30,144 (36.41%)	29,324 (-2.72%)	34,645 (18.14%)	18,530 (-46.51%)
	R	847	2,652 (213.1%)	3,860 (45.55%)	55,866 (1447.3%)	23,882 (-57.25%)
	L	89.8	523.2 (587.64%)	1,104.6 (111.08%)	1,639 (48.46%)	6,705 (409%)
	S	7.054	113,790 (1,500.1%)	254,970 (124.07%)	461,220 (80.89%)	462,820 (0.34%)
British banks	E	9,385	42,272 (450.42%)	157,900 (373.53%)	128,100 (-18.87%)	1,991,500 (1,555%)
	TL	170,610	629,890 (369.19%)	1,540,600 (244.83%)	3,682,100 (139.09%)	34,473,000 (936%)
	TL/L	1,793	2,798 (56.05%)	1,203 (-57.00%)	1,536 (27.68%)	1,535 (-0.65%)
	WL	19,731	31,875 (61.54%)	30,937 (-2.94%)	23,433 (-24.25%)	19,226 (-17.95%)
	R	1,444	2,395 (65.85%)	6,506 (171.64%)	8,480 (30.34%)	92,927 (1,095%)
	L	156.8	339.7 (117.3%)	2,415 (712.38%)	3,107 (28.65%)	35,899 (1,155%)
	S	17,709	51,426 (190.39%)	230,670 (448.54%)	729,440 (316.22%)	2,571,800 (352.67%)

Notes: All figures are expressed in thousands of pounds sterling except those of variable L, WL. E is total operating expenses, TL is total loans, TL/L is total loans per employee, WL is average employee earnings, R is capital depreciation, S is total securities and L is number of employees.

Table B.2 indicates that W. German banks' total operating expenses and bank output measured by total loans are continuously increasing with bank size, although total loans per employee (alternative measure of bank output) seem to be both increasing and decreasing as bank size rises. However, for economies of scale to exist, the increase in output has to be greater than the increase in total costs (total operating expenses). This is true only for the largest banks in our sample (total assets in excess of £10 billion); total operating expenses increased by 154.7 per cent, while total loans increased by an impressive 366.1 per cent (total loans per employee registered another decrease). Therefore, when total loans is the chosen measure of output there is some evidence of economies of scale but if total loans per employee is chosen, then there do exist only diseconomies of scale (increases in output are lower than increases in total operating expenses).

Moreover, when increases in output are achieved with less than proportionate increases in the use of inputs (average employee earnings and capital depreciation, WL and R), then there exist increasing returns to scale and when increases in output are caused by more than proportionate increases in the use of inputs then there exist decreasing returns to scale. The existence of decreasing (increasing) returns to scale implies that there exist decreasing (increasing) economies of scale The percentage increases and decreases observed by both bank output measures (total loans and total loans per employee) and the two inputs, suggest that there exist increasing as well as decreasing returns to scale for this particular sample of banks. More specifically, strong increasing returns to scale exist for the second largest size category of banks (total assets between £5-£10 billion) for which output is icreased by 179.9 per cent and 41.1 per cent (total loans and total loans per employee respectively), but average employee earnings decrease by 10.7 per cent and capital depreciation is increased by only 25.61 per cent.

French banks' total operating expenses and bank output measured by total loans are continuously increasing with bank size, although total loans per employee (alternative measure of bank output) shows a decline as well, as bank size rises. When total loans is the chosen measure of output, the three largest size categories exhibit economies of scale, and if total loans per employee is chosen, then, the two largest size categories of banks exhibit economies of scale. More specifically, banks with total assets between £5-£10 billion, show a 25.22 per cent increase in total operating expenses, while total loans increased by 74.01 per cent and total loans per employee increased by only 90.68 per cent. Banks with total assets exceeding £10 billion, report a 142.07 per cent increase in total operating expenses, while total loans increased by a substantial 568.41 per cent and total loans per employee increased by 624.31 per cent.

Moreover, as we pointed out earlier, there exist increasing or decreasing returns to scale (when increases in output are achieved with less or more than proportionate increases in the use of inputs). The percentage increases and decreases observed by both bank output measures (total loans and total loans per employee) and the two inputs, suggest that there exist increasing as well as decreasing returns to scale for this particular sample of banks. More specifically, strong increasing returns to scale exist for the largest banks (assets exceeding £10 billion) and the second largest size category of banks (total assets between £2-£5 billion) for which output is icreased by 208.6 per cent and 46.26 per cent (total loans and total loans per employee respectively), but average employee earnings decrease by 2.72 per cent and capital depreciation is increased by only 45.55 per cent.

Finally, as regards British banks we observe that, although, total loans is consistently increasing as bank size rises, total loans per employee appears to be increasing for two size categories and decreasing for two size categories of banks. Increasing economies of scale were observed only for the second largest category of banks (total assets between £5 and £10 billion) when both measures of bank output are concerned.

Table B.3 shows the means of selected ratios for the same size categories of banks.

Table B.3. Means of selected efficiency indicators for different size categories of banks.

	VARIABLE	0-500m	500mil.-2bil.	2bil.-5bil.	5bil.-10bil.	>10bil.
	E/TA	0.05089	0.02462	0.03087	0.03487	0.0136
	E/TD	0.08721	0.0864	0.04974	0.10332	0.04937
W. German	E/TL	0.04932	0.06103	0.05457	0.06828	0.03274
	E/PRGROSS	3.2273	8.4736	5.4038	9.9639	4.2748
	E/PRNET	7.5006	39.42	12.75	18.54	8.6659
	I/TA	0.03362	0.00438	0.01392	0.00791	0.00443
banks	I/TD	0.02302	0.00855	0.02094	0.00405	0.00149
	I/TL	0.01901	0.00484	0.02301	0.01465	0.00478
	W/TD	0.024	0.023	0.017	0.016	0.02
	E/TA	0.06124	0.08434	0.08361	0.0563	0.0352
	E TD	0.2379	0.3766	0.329	0.101	0.284
French	E TL	0.1169	0.2628	0.2242	0.157	0.367
	E/PRGROSS	25.99	29.74	23.05	13.54	20.17
	E/PRNET	49.5	78.96	72.63	23.01	24.12
	I/TA	0.02639	0.01674	0.019	0.0184	0.0151
banks	I/TD	0.0934	0.05	0.0717	0.051	0.047
	I/TL	0.0459	0.0348	0.041	0.0412	0.149
	W TD	0.042	0.048	0.052	0.027	0.062
	E/TA	0.0421	0.0539	0.0497	0.016	0.0318
	E/TD	0.139	0.0772	0.0617	0.0265	0.0421
British	E TL	0.113	0.134	0.278	0.0558	0.0795
	E/PRGROSS	1.385	13.35	6.23	2.16	23.68
	E/PRNET	1.091	29.08	9.33	-5.77	5.67
	I/TA	0.0233	0.0197	0.0221	0.0104	0.0239
banks	I/TD	0.0576	0.033	0.0261	0.0165	0.0334
	I/TL	0.0874	0.0418	0.0752	0.0266	0.067
	W/TD	0.035	0.013	0.0171	0.015	0.0136

Notes: E/TA, E/TD, E/TL, E/PRGROSS and E/PRNET are the ratios of total operating expenses to total assets, total deposits, total loans and gross and net profits respectively. I/TA, I/TD and I/TL are the ratios of net interest income to total assets, total deposits and total loans respectively, and W/TD is the ratio of total personnel expenses to total deposits.

The figures shown in Table B.3 suggest that W. German banks' means of ratios total operating expenses to total assets, total deposits and total loans (E/TA, E/TD and E/TL) have registered both increases and decreases as banks become bigger. The ratio of operating expenses to total assets ranges from 0.013 to 0.050, whereas the ratio of operating expenses to total deposits ranges from 0.04 to 0.10. Moreover, the figures indicate that operating expenses were many times higher (as high as 39.4 times) than gross and net profits.

Furthermore, the mean ratios of net interest income to total assets, total deposits and total loans are initially decreasing as bank size rises, then increasing for banks with total assets between £2 and £5 billion and finally decreasing for the two largest size categories of banks in the sample. A somewhat similar trend may be observed to be developing for the mean ratio of total personnel expenses to total deposits which ranges from 0.016 to 0.024. Therefore, the performance of these ratios seems to support our earlier descriptive findings as regards the variability of bank costs and bank output with bank size.

French banks' means of ratios total operating expenses to total assets, total deposits and total loans have initially registered one increase and then two decreases (for the two largest size categories of banks) as banks become bigger. The ratio of operating expenses to total assets ranges from 0.035 to 0.084 and the ratio of operating expenses to total deposits ranges from 0.10 to 0.37. A similar trend may be observed to be developing for the mean ratios of net interest income to total assets, total deposits and total loans; these ratios are initially decreasing, then increasing and lastly decreasing as banks become bigger.

Furthermore, the ratio of net interest income to total assets ranges from 0.015 to 0.026 and the ratio of net interest income to total deposits ranges from 0.047 to 0.09. The figures also indicate that operating expenses were many times higher (as high as 78.96 times) than gross and net profits. Moreover, the ratio of total personnel expenses to total deposits seems to be increasing for the first two size categories of banks and then decreasing for the largest size banks. Hence, the performance of these ratios seems to support our previous findings regarding the variability of bank output and costs with increasing bank size.

Finally, British banks' means of the efficiency indicators shown in Table B.3 are registering both increases and decreases as bank size rises. The ratio of net interest income to total assets ranges from 0.010 to 0.023 and the ratio of net interest income to total loans from 0.026 to 0.087. The ratios of operating expenses to gross and net profits (as high as 29.08) were much lower than the corresponding ratios of French banks, but they were quite comparable with the ratios observed by W. German banks

2.2 Description of cost and output variables of the pooled sample.

The pooled three-country sample consists of 169 observations. Table B.4 shows descriptive statistics for the variables we used in our empirical estimation.

Table B.4. Descriptive statistics of input, output and cost variables of banks.

VARIABLE	MEAN	STAN. DEV.	VARIANCE	MINIMUM	MAXIMUM
E	364,360	872,320	76,095E+10	6,021	5,420,000
TL	7,437,600	16,516,000	27,279E+13	2,225	97,749,000
TL/L	5,534	23,106	53,389E+07	50	222,630
WL	29,690	13,940	194,330,000	7,330	93,385
R	16,847	42,404	17,981E+08	56	253,000
L	6,321	16,679	278,190,000	12	95,006
S	371,090	1,154,900	13,339E+11	34	10,260,000

Notes: The above figures are expressed in thousands of pounds sterling except those of variables WL and L.

Table B.4 indicates that our banks' (combined sample) mean total operating expenses rose to £364.3 million (in comparison with £189.4 million and £235.5 million for W.

German and French banks respectively), with a minimum of £6.0 million and a maximum of £5,420 million. The banks' mean of total loans reached £7,437 million, with a minimum of £2.2 million and a maximum of £97,749 million. Furthermore, the mean figure of total loans per employee was £5.5 million (compared with £5.3 million and £8.5 million for W. German and French banks respectively), with a minimum value of £50 thousand and a maximum of £222 million. The mean figures for the independent input variables WL and R, rose to £29.6 thousand and £16.8 million respectively, with minimum values of £7,330 and £56.5 thousand and maximum values of £93,385 and £253 million respectively. These banks on average employed 6,321 employees, with a minimum of 12 and a maximum of 95,006 employees. Finally, the mean figure for total securities reached £371 million, with a minimum of £34.8 thousand and a maximum of 10,260 million.

The following table (Table B.5) shows the means of selected variables for different size categories of banks.

TABLE B.5. Means of bank input, output and cost variables (pooled sample 1990).

VAR.	0-500m 17 observ.	500m-1bil. 22 observ.	1bil.-2bil. 27 observ.	2bil.-3bil. 23 observ.	3bil.-5bil. 28 observ.	5bil.-12bil. 29 observ.	>12bil. 23 observ.
E	13,567	24,922 (83.69%)	77,845 (212.3%)	106,460 (36.75%)	181,870 (70.83%)	194,550 (6.97%)	1,372,800 (605.6%)
TL	327,380	456,000 (39.28%)	594,560 (30.38%)	1,204,300 (102.5%)	2,222,500 (84.54%)	4,675,400 (110.3%)	29,737,000 (536%)
TL/L	3,734	1,158 (-68.9%)	956 (-17.4%)	666 (-30.3%)	1,660 (149.2%)	1,894 (14.09%)	1,123 (-40.7%)
WL	36,159	25,382 (-29.8%)	31,375 (23.61%)	26,228 (-16.4%)	39,987 (52.45%)	27,836 (-30.38%)	26,412 (-5.11%)
R	450	1,541 (242.4%)	2,449 (58.92%)	4,409 (80.03%)	4,873 (10.52%)	6,732 (38.14%)	68,886 (923.2%)
L	131.2	393.6 (200%)	621.3 (58.01%)	1,808.1 (191.1%)	1,338.8 (-25.9%)	2,468.3 (84.45%)	26,475 (972.7%)
S	8,365	11,752 (40.49%)	92,760 (689.3%)	54,119 (-41.6%)	155,330 (187%)	352,220 (126.7%)	1,303,700 (270.1%)

Notes: All figures are expressed in thousands of pounds except those of variable L, WL. E is total operating expenses, TL is total loans, TL/L is loans per employee, WL is average employee earnings, R is capital depreciation, S is securities and L is number of employees.

We divided our original sample into seven sub-samples; banks with total assets up to £500mil. (17 observations), £500mil.-£1bil. (22 observations), £1-£2bil. (27 observations), £2-£3bil. (23 observations), £3-£5bil. (28 observations), £5-£12bil. (29 observations) and banks with total assets exceeding £12bil. (23 observations).

Table B.5 indicates that bank output (measured by total loans per employee), seems to be decreasing rather than increasing (registering more decreases than increases) as bank size and operating expenses rise. Moreover, for economies of scale to exist, the increase in output has to be greater than the increase in total costs (total operating expenses). This seems to be the case for the last four size categories of banks if total loans is the chosen measure of bank output, but it is true only for two size categories of banks, when the measure total loans per employee is considered as the appropriate measure of bank output. More specifically, taking into account both measures of bank output, economies of scale may be observed to exist for banks with total assets between £3 and £5 billion and between £5 and £12 billion. In the former category of banks, total operating expenses increased by 70.83 per cent, while total loans increased by 84.54 per cent and total loans per employee increased by 149.2 per cent. In the latter group of banks, operating expenses increased by 6.97 per cent, while total loans increased by 110.3 per cent and total loans per employee increased by 14.09 per cent.

Moreover, the percentage increases and decreases observed by both bank output measures (total loans and total loans per employee) and the two inputs (average employee earnings and capital depreciation), suggest that there exist increasing as well as decreasing returns to scale for various size categories of banks [increasing (decreasing) returns of scale imply the existence of increasing (decreasing) economies of scale]. More specifically, strong increasing returns to scale exist for banks with total assets between £3-£5 billion, for which output is icreased by 84.54 per cent and 149.2 per cent (total loans and total loans per employee respectively), whereas average employee earnings increase by 52.45 per cent and capital depreciation is increased by only 10.52 per cent.

Table B.6 shows the means of selected ratios for the same size categories of banks.

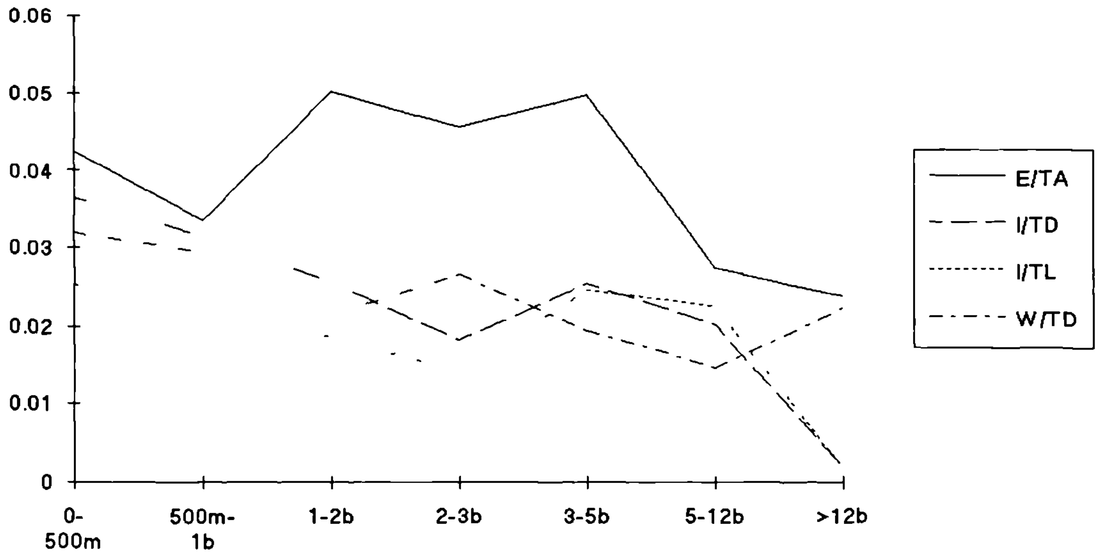
TABLE B.6. Means of selected ratios (efficiency indicators) for different size categories of banks (1990).

VAR.	0-500m 17 observ.	500m-1bil. 22 observ.	1bil.-2bil. 27 observ.	2bil.-3bil. 23 observ.	3bil.-5bil. 28 observ.	5bil.-12bil. 29 observ.	>12bil. 23 observ.
E/TA	0.04249	0.03365	0.05035	0.04597	0.05016	0.02767	0.02413
E/TD	0.0414	0.0392.	0.0775	0.07782	0.0818	0.0416	0.0807
E/TL	0.06627	0.0546	0.0395	0.09991	0.18325	0.06348	0.04622
E/PRG	34.96	6.6013	13.08	7.7543	12.6	6.4814	16.95
E/PRN	52.35	15.23	48.04	18.71	21.94	12.46	11.92
I/TA	0.0246	0.01232	0.00964	0.00922	0.0118	0.0089	0.00657
I/TD	0.03642	0.0315	0.02572	0.01845	0.02574	0.0204	0.0019
I/TL	0.02526	0.02136	0.01872	0.0145	0.02495	0.02265	0.00178
W TD	0.032	0.0295	0.02165	0.0268	0.0197	0.0148	0.0225

Notes: E TA, E/TD, E TL, E/PRGROSS and E/PRNET are the ratios of total operating expenses to total assets, total deposits, total loans and gross and net profits respectively. I/TA, I/TD and I/TL are the ratios of net interest income to total assets, total deposits and total loans respectively and W/TD is the ratio of total personnel expenses to total deposits.

The figures presented in the above table suggest that the means of ratios total operating expenses to total assets, total deposits and total loans have registered both increases and decreases as banks become bigger. The ratio of operating expenses to total assets ranges from 0.024 to 0.050, whereas the ratio of operating expenses to total deposits ranges from 0.039 to 0.081. The mean ratios of net interest income to total assets, total deposits and total loans (I/TA, I/TD and I/TL) also seem to be both increasing and decreasing as bank size rises. Additionally, as regards the ratio of total personnel expenses to total deposits a similar trend may be observed as bank size is increased; this ratio ranges from 0.014 to 0.032. These figures also indicate that operating expenses were many times higher (as high as 52.35 times and as low as 6.4 times) than gross and net profits. Hence, the performance of these efficiency ratios seems to support our earlier findings regarding the variability of bank output and costs with bank size.

Figure B.1. Graph depicting the performance of selected efficiency indicators for various categories of banks (1990).



Notes: I/TD and I/TL are the ratios of net interest income to total deposits and total loans, E/TA is the ratio of operating expenses to total assets and W/TD is the ratio of personnel expenses to total deposits. I/TD, I/TL, E/TA and W/TD are plotted on the vertical axis and bank size categories are plotted on the horizontal axis (distinguished by bank total assets measured in pounds sterling, m denotes million and b billion).

APPENDIX 3.

ESTIMATES OF SCALE ECONOMIES USING STOCHASTIC COST FRONTIER.

Table A3.1. Partial and overall scale estimates for the sample of three countries

Assets size (m £)	Q_1	Q_2	Overall
0-1000	0.2059	0.58	0.7859
1000-10000	0.2057	0.6355	0.8412
10000-25000	0.21	0.6609	0.8709
25000-50000	0.2257	06471	0.8728
50000<	0.2238	0.6772	0.901
All	0.1616	0.5601	0.7217

Table A3.2. Partial and overall scale estimates for German banks.

Assets size	Q_1	Q_2	Overall
0-1000	0.5532	0.3079	0.8611
1000-10000	0.5597	0.3027	0.8624
10000-25000	0.5455	0.3183	0.8638
25000-50000	0.5758	0.2888	0.8646
50000<	0.5505	0.3149	0.8654
All	0.4897	0.3675	0.8572

Table A3.3. Partial and overall scale estimates for French banks.

Assets size	Q_1	Q_2	Overall
0-1000	0.4889	0.3155	0.8044
1000-10000	0.4767	0.4471	0.9238
10000-25000	0.5583	0.4193	0 896
25000-50000	0.6935	0.3276	0.8859
50000	0.7195	0.3151	1.0086
All	0.1841	0.4244	1.1439

Table A3.4. Partial and overall scale estimates for British banks.

Assets size	Q_1	Q_2	Overall
0-1000	0.2643	0.5278	0.7921
1000-10000	0.2553	0.5496	0.8049
10000-25000	0.2551	0.5578	0 8129
25000-50000	0.2745	0.5378	0.8123
50000	0.2755	0.5428	0.8183
All	0.2191	0.5548	0.7739

Table A3.5. Translog cost frontier parameter estimates for the sample of three countries.

Variable	Coefficient	Estimates	Stand. error	T ratio
Intercept	a_0	3.5956	11.71	0.3071
LnQ_1	a_1	0.1616	0.047	3.4397
LnQ_2	a_2	0.5601	0.0578	9.6923
LnP_1	β_1	0.6167	0.1155	5.3391
LnP_2	β_2	0.3833	0.0647	5.9247
LnQ_1 LnQ_1	δ_{11}	0.0112	0.0134	0.8387
LnQ_1 LnQ_2	δ_{12}	-0.0076	0.0123	-0.6155
LnQ_2 LnQ_2	δ_{22}	0.0253	0.0169	1 4919
LnP_1 LnP_1	γ_{11}	0.1278	0.0354	3.6131
LnP_1 LnP_2	γ_{12}	-0.1278	0.0354	-3.6131
LnP_2 LnP_2	γ_{22}	0.1278	0.0354	3.6131
LnP_1 LnQ_1	ρ_{11}	0.0111	0.0206	0.54
LnP_2 LnQ_1	ρ_{21}	-0.0111	0.0206	-0.54
LnP_1 LnQ_2	ρ_{12}	0.0097	0.0178	0.5467
LnP_2 LnQ_2	ρ_{22}	-0.0097	0.0178	-0.5467
	σ_u σ_v	0.5518	18.08	0.0305
	σ^2_v/σ^2_u	0.5815	5.94	0.0979
Variance components		σ_v 0.2592		σ_u 0 0789

Table A3.6. Translog cost frontier parameter estimates for the German banks.

Variable	Coefficient	Estimates	Stand. error	T-ratio
Intercept	a_0	2.5099	2.984	0.8411
LnQ_1	a_1	0.4897	0.0886	5.5247
LnQ_2	a_2	0.3675	0.1037	3.5442
LnP_1	β_1	0.7316	0.2949	2.4809
LnP_2	β_2	0.2684	0.725	0.3702
$LnQ_1\ LnQ_1$	δ_{11}	0.0177	0.0253	0.6967
$LnQ_1\ LnQ_2$	δ_{12}	-0.0172	0.0181	-0.949
$LnQ_2\ LnQ_2$	δ_{22}	0.0176	0.022	0.7992
$LnP_1\ LnP_1$	γ_{11}	0.1635	0.0635	2 5764
$LnP_1\ LnP_2$	γ_{12}	-0.1635	0.0635	-2.5764
$LnP_2\ LnP_2$	γ_{22}	0.1635	0.0635	2.5764
$LnP_1\ LnQ_1$	ρ_{11}	-0.0262	0.0475	-0.5519
$LnP_2\ LnQ_1$	ρ_{21}	0.0262	0.0475	0.5519
$LnP_1\ LnQ_2$	ρ_{12}	-0.0407	0.0267	-1.5251
$LnP_2\ LnQ_2$	ρ_{22}	0.0407	0.0267	1.5251
	$\sigma_u\ \sigma_v$	0.926	8.842	0.1047
	σ^2_v/σ^2_u	0.4286	2.549	0.1681
Variance components		σ_v 0.0989		σ_u 0.0848

Table A3.7. Translog cost frontier parameter estimates for the French banks.

Variable	Coefficient	Estimates	Stand. error	T ratio
Intercept	a_0	4.3317	1.171	3.6991
LnQ_1	a_1	0.1841	0.0845	2.1791
LnQ_2	a_2	0.4244	0.0774	5.4869
LnP_1	β_1	0.5114	0.2096	2.4401
LnP_2	β_2	0.4886	0.1187	4.11
$LnQ_1\ LnQ_1$	δ_{11}	0.0851	0.0206	4.1404
$LnQ_1\ LnQ_2$	δ_{12}	-0.0578	0.0195	-2.9695
$LnQ_2\ LnQ_2$	δ_{22}	0.079	0.0321	2.4632
$LnP_1\ LnP_1$	γ_{11}	0.0199	0.1355	0 147
$LnP_1\ LnP_2$	γ_{12}	-0.0199	0.1355	-0.147
$LnP_2\ LnP_2$	γ_{22}	0.0199	0.1355	0.147
$LnP_1\ LnQ_1$	ρ_{11}	0.0474	0.0358	1.3245
$LnP_2\ LnQ_1$	ρ_{21}	-0.0474	0.0358	-1.3245
$LnP_1\ LnQ_2$	ρ_{12}	0.0071	0.0304	0.2342
$LnP_2\ LnQ_2$	ρ_{22}	-0.0071	0.0304	-0.2342
	$\sigma_u\ \sigma_v$	1.6309	5.169	0.3155
	σ^2_v/σ^2_u	0.4409	1.439	0.3064
Variance components		σ_v 0.0531		σ_u 0.1413

Table A3.8. Translog cost frontier parameter estimates for the British banks.

Variable	Coefficient	Estimates	Stand. error	T-ratio
Intercept	a_0	2.5824	4.092	0.6311
LnQ_1	a_1	0.2192	0.0752	2.9154
LnQ_2	a_2	0.5548	0.072	7.7045
LnP_1	β_1	0.6318	0.2025	3.12
LnP_2	β_2	0.3682	0.132	2.7894
$LnQ_1\ LnQ_1$	δ_{11}	0.0143	0.0254	0.5641
$LnQ_1\ LnQ_2$	δ_{12}	-0.0124	0.0362	-0.3437
$LnQ_2\ LnQ_2$	δ_{22}	0.0152	0.0501	0.3035
$LnP_1\ LnP_1$	γ_{11}	0.1192	0.0838	1.422
$LnP_1\ LnP_2$	γ_{12}	-0.1192	0.0838	-1.422
$LnP_2\ LnP_2$	γ_{22}	0.1192	0.0838	1.422
$LnP_1\ LnQ_1$	ρ_{11}	0.0311	0.0429	0.7256
$LnP_2\ LnQ_1$	ρ_{21}	-0.0311	0.0429	-0.7256
$LnP_1\ LnQ_2$	ρ_{12}	0.1134	0.034	3.3389
$LnP_2\ LnQ_2$	ρ_{22}	-0.1134	0.034	-3.3389
	$\sigma_u\ \sigma_v$	0.8699	14.14	0.0615
	σ^2_v/σ^2_u	0.3593	3.354	0.1071
Variance components		σ_v 0.0735		σ_u 0.0556

Table A3.9. Number of banks for each country.

Assets size (m £)	All	Germany	France	U.K
0-1000	49	20	15	14
1000-10000	86	40	21	25
10000-25000	19	10	5	4
25000-50000	7	3	1	3
50000<	8	3	1	4
All	169	76	43	50

Table A3.10. Descriptive statistics of total assets according to banks' size and countries.

Assets size (m £)	Mean	Median	Stand. Dev.	Min.	Max
0-1000	494	467	265	11	990
1000-10000	3500	2585	2264	1000	9540
10000-25000	14658	14000	4297	10100	24700
25000-50000	33971	31100	7092	27000	46800
50000<	87413	81950	29727	55200	135000
Germany (all banks)	8015	2125	16129	11	88800
France (all banks)	7039	1930	16536	137	102000
U.K (all banks)	12581	3465	26988	114	135000

Table A3.11. Inefficiency scores for each bank and for all countries.

1	0 2302	31	0 3124	61	0 179	91	0 4069	121	0 2381	151	0 3356
2	0 193	32.	0 1958	62	0 2402	92	0 2863	122	0 1623	152	0 262
3	0 2825	33.	0 149	63.	0 2167	93	0 2435	123	0 1819	153	0 2046
4	0 2047	34.	0 1841	64	0 2638	94	0 1864	124	0 3723	154	0 1526
5	0 1714	35	0 2004	65	0 144	95	0 2437	125	0 1904	155	0 145
6	0 228	36.	0 2463	66.	0 2398	96	0 3109	126	0 1703	156	0 3683
7.	0.2073	37	0.1893	67.	0.2076	97	0 2046	127	0 158	157	0 1885
8.	0.1936	38.	0.1474	68.	0 1772	98	0 2727	128	0 369	158	0 1453
9.	0.2271	39.	0.2183	69.	0 2075	99	0 309	129	0 3369	159	0 1621
10.	0.1824	40.	0.2665	70.	0.265	100.	0 2317	130	0 2124	160	0 1493
11.	0.2842	41.	0.1927	71.	0 2387	101	0 2334	131	0 2912	161	0 1398
12.	0.1966	42.	0.2026	72.	0.1629	102	0 291	132	0 2203	162	0 1968
13.	0.2248	43.	0.3131	73.	0.2186	103.	0 2914	133	0 2697	163	0 1887
14.	0.2078	44.	0.2699	74.	0.2525	104.	0 2959	134	0 1759	164	0 181
15.	0.204	45.	0.2352	75.	0.189	105.	0.2521	135	0 257	165	0 1816
16.	0.2022	46.	0.215	76.	0.1903	106.	0 2743	136	0 2788	166	0 1798
17.	0 194	47	0 2292	77	0 1933	107	0 2672	137	0 2198	167	0 143
18.	0.2062	48.	0.2533	78.	0.1538	108.	0 3084	138	0 2596	168	0 1699
19.	0.2097	49.	0.2271	79.	0.1584	109.	0 1895	139	0 222	169	0 1568
20.	0.2861	50.	0.2395	80.	0.211	110.	0 2842	140	0 148		
21.	0.247	51.	0.1546	81.	0.2435	111	0 1384	141	0 2284		
22.	0.2317	52.	0.2764	82.	0.2361	112.	0 1704	142	0 161		
23.	0.2814	53.	0.2296	83.	0.2667	113.	0 2828	143	0 1476		
24.	0.2272	54.	0.1969	84.	0 2093	114	0 3139	144	0 1501		
25.	0.2022	55.	0.3667	85	0 2833	115	0 144	145	0 1784		
26	0.2498	56.	0.1745	86.	0 2686	116	0 2525	146	0 2472		
27.	0.3042	57.	0.2298	87.	0.1994	117	0 2318	147	0 1788		
28	0 2503	58.	0.1901	88	0 2266	118	0 2347	148	0 1516		
29	0 2386	59	0 1912	89	0 3444	119	0 1885	149	0 1564		
30	0 235	60.	0 2477	90	0 2084	120	0 2331	150	0 1856		

Table A3.12. Inefficiency scores for French banks.

1	0 1465	12	0 1625	23	0 6453	34	0 602
2	0 3265	13	0 2451	24	0 2226	35	0 1491
3	0 1242	14.	0 1268	25.	0 1726	36	0 8335
4	0 1769	15.	0 4463	26	0 4026	37	0 4303
5	0 1504	16	0 3247	27	0 3932	38	0 3284
6.	0 2696	17.	0 242	28	0 4356	39	0 1269
7	0.382	18.	0 1379	29	0 26	40	0 2614
8.	0.1365	19.	0.3706	30.	0 3901	41	0 144
9.	0.4221	20.	0.4514	31.	0 1388	42	0 4243
10.	0.2499	21.	0.2538	32.	0 6321	43	0 117
11.	0.3228	22.	0.3124	33.	0 1376		

Table A3.13. Scale efficiency scores for French banks.

1.	1.052	12.	1.0178	23.	1 002	34	1 0658
2.	0.9327	13.	0 8699	24.	0 8881	35	1 4571
3.	1.0626	14.	1.0447	25.	0 9106	36	0 8384
4.	0.9718	15.	1.0089	26.	0 9913	37	0 9484
5.	0.8789	16.	0.8327	27.	0 8535	38	0 9197
6.	0.8006	17.	0 9491	28.	0 9365	39	0 8098
7.	1.1589	18.	0.8389	29.	1 0716	40	1 4084
8.	0.804	19.	0 8815	30.	0 9762	41	0 8798
9.	0.9302	20.	0 9327	31	1 0516	42	1 2487
10.	1.0041	21.	1 0542	32	1 0114	43	1 3275
11	1.0809	22.	0 9865	33	0 9052		

Table A3.14. Inefficiency scores for German banks.

1	0 2407	17	0 1937	33	0 4129	49	0 2044	65	0 1237
2	0 1511	18	0 1816	34	0 1275	50	0 1911	66	0 2584
3	0 3726	19	0 1798	35	0 1973	51	0 1366	67	0 1722
4	0 1858	20.	0 3898	36	0 2646	52	0 3652	68	0 1311
5	0 1331	21	0 2517	37	0 1818	53	0 2457	69	0 2042
6	0.221	22.	0 2367	38	0 1135	54	0 1565	70	0 315
7.	0 2225	23.	0.4658	39.	0 2094	55	0 3872	71	0 2726
8.	0.186	24.	0.2525	40	0 3078	56	0 1181	72	0 1052
9	0.2298	25.	0 2599	41	0 1554	57	0 224	73	0 1978
10.	0.1378	26.	0.3228	42.	0 1523	58	0 1576	74	0 2598
11.	0 4037	27.	0 443	43	0 4653	59	0 16	75	0 1615
12.	0.1694	28.	0.2915	44.	0 2103	60	0 2626	76	0 1634
13.	0.2234	29.	0.2539	45.	0 2327	61	0 1227		
14.	0.1916	30.	0.2452	46.	0 198	62	0 2392		
15.	0.1958	31.	0.4422	47.	0 2522	63	0 222		
16	0.1709	32.	0.1535	48.	0 3069	64	0 3381		

Table A3.15. Scale efficiency scores for German banks

1.	0.9548	17.	1.0273	33.	0 7886	49	0 8155	65	0 7739
2.	0.8541	18.	0.867	34.	0 9687	50	1 1255	66	0 9704
3	0.884	19.	0.9799	35.	0 8699	51	0 8361	67	0 9787
4.	0 8743	20.	0.9066	36.	1 0028	52	0 9399	68	0 8525
5	1 0767	21	1 0358	37	0 9785	53	0 9398	69	0 934
6.	0 9707	22.	0.9962	38	0 7814	54	0 7654	70	0 9039
7	0 8852	23.	0 8576	39	0 8669	55	0 7972	71	0 9023
8	0 902	24.	0 942	40	11,074	56	0 9929	72	0 7796
9.	0 9346	25.	1.3342	41.	0 9138	57	0 9692	73	0 9599
10.	0.8034	26.	0.7949	42.	0 7913	58	0 8439	74	1 0487
11.	0 9901	27.	0.9505	43	0 9919	59	0 8753	75	0 9042
12	0 9111	28.	0 9797	44	1 397	60	0 8968	76	0 8869
13	0 925	29.	0 977	45	0 9943	61	0 7652		
14	0 8697	30.	0 9299	46	0 8673	62	0 7733		
15	0 7906	31.	0 9992	47	0 9867	63	0 9351		
16	0 8198	32	0 8439	48	0 9442	64	0 9603		

Table A3.16. Inefficiency scores for British banks.

1.	0.2816	11.	0 2403	21.	0 1244	31	0 197	41	0 0985
2.	0.258	12	0.2286	22	0 1991	32	0 1966	42	0 2378
3.	0 1487	13.	0 249	23	0 1402	33	0 327	43	0 1883
4	0.1236	14.	0 2402	24	0 1519	34	0 1051	44	0 1539
5.	0 3426	15.	0 1462	25	0 187	35	0 1231	45	0 1411
6.	0.1235	16.	0 327	26.	0 1116	36	0 1044	46	0 2007
7.	0.1329	17.	0 1737	27	0.1857	37	0 3335	47	0 1142
8	0 1751	18	0 1888	28	0 2449	38	0 2295	48	0 1703
9.	0.2642	19.	0.1533	29.	0 1205	39	0 1017	49	0 1704
10.	0.3085	20.	0 2483	30.	0 1583	40	0 1214	50	0 1448

Table A3.17. Scale efficiency scores for British banks.

1.	0.8618	11.	0.8716	21.	1 0779	31.	0 8031	41	0 7473
2.	0.8923	12.	0.9377	22.	0.9282	32.	1 0192	42	0 7014
3.	0.8147	13.	0.904	23	0 7713	33.	0 886	43	0 8983
4.	0.7214	14.	0.8998	24.	0 8293	34	0 8365	44	0 7688
5.	1.0182	15.	0.746	25.	0 7043	35.	0 7155	45	0 7675
6.	0.8588	16.	1.0729	26.	0 6715	36.	0 8185	46	0 8146
7.	0.737	17.	0.901	27	0 697	37	0 963	47	0 7828
8	0.8585	18.	0 8643	28.	0 7047	38	0 8047	48	0 7061
9	1.0393	19.	0 9067	29	0 8015	39	0 7683	49	0 803
10	0 9631	20.	1 3528	30	0 574	40	0 827	50	0 7505

Table A3.18. Scale efficiency scores for each bank and for all countries.

1.	0.8244	31.	0.9456	61.	0.793	91.	0.9582	121.	0.7534	151.	0.9136
2.	0.8032	32.	0.7658	62.	0.8194	92.	0.8826	122.	0.8792	152.	0.924
3.	0.7646	33.	0.834	63.	0.8725	93.	0.8264	123.	0.7822	153.	0.7728
4.	0.8914	34.	0.8139	64.	0.8458	94.	0.8936	124.	0.9548	154.	0.7926
5.	1 0232	35.	0 8524	65.	0 793	95.	0.9131	125.	0.9278	155.	0.749
6.	0.9575	36.	0.9425	66.	0.8892	96.	0.8658	126.	0.7724	156.	0.8263
7.	0.9116	37	1.0246	67.	0.9305	97.	1.1176	127.	0.845	157.	0.7585
8.	1.0256	38.	0.8476	68.	0.9426	98.	1.0462	128.	0.962	158.	0.7894
9.	0.8492	39.	0.8823	69.	0.8912	99.	0.983	129.	1.0338	159.	0.8577
10.	0.8633	40.	1.0178	70.	0.844	100.	0.9344	130.	0.9265	160.	0.8182
11.	1.1256	41.	0.9255	71.	0.9265	101.	0.8428	131.	0.8544	161.	0.7812
12.	0.8288	42.	0.7512	72.	0.7947	102.	0.942	132.	0.9529	162.	0.7656
13.	0.7245	43.	1.1265	73.	0.8962	103.	0.7824	133.	0.7624	163.	0.7948
14.	0.7854	44.	1.1972	74.	1.1048	104.	0.8653	134.	0.8548	164.	0.763
15.	0.8317	45.	1.0562	75.	0.945	105.	1.0378	135.	1.147	165.	0.8256
16.	0.8523	46.	0 902	76.	0.8592	106.	0.9421	136.	0.9276	166.	0.7485
17	0 983	47	0 9056	77.	0.9868	107.	1.1286	137.	0.8132	167.	0.788
18.	0.7826	48.	0.8937	78.	0.8834	108.	0.9774	138.	0.8497	168.	0.7912
19.	0.9284	49.	0.8563	79.	0.9852	109.	0.8699	139.	1.289	169.	0.8464
20.	0.8621	50.	1.0924	80.	1.035	110.	1.0134	140.	1.106		
21.	1.238	51.	0.7936	81.	0.8194	111.	1.2165	141.	0.8927		
22.	0.9145	52.	0.8548	82.	0.7836	112.	0.0762	142.	0.825		
23.	0.7734	53.	0.8827	83.	1.0988	113.	0.8264	143.	0.7275		
24.	0.8264	54.	0.8122	84.	0.8238	114.	0.8575	144.	0.7835		
25.	1.1247	55.	0.7584	85.	0.7966	115.	0.765	145.	0.7438		
26	0.7736	56.	1.1162	86.	0.9752	116.	1.2687	146.	0.8192		
27.	0.8922	57.	0.9557	87.	0 9975	117.	0.8848	147.	0.8266		
28.	0.9228	58.	0.8949	88.	1.1265	118.	1.1365	148.	0.7845		
29.	0.9148	59.	0.8245	89.	0.9092	119.	1.1863	149.	0.6638		
30.	0.882	60.	0.9258	90.	0.9914	120.	0.8426	150.	0.7616		

Table A3.19 The effect of market structure and efficiency variables on gross profit rates (gross profits/total income).

Variable name	Est. coefficient	T-ratio (154 DF)	Elasticity at means	Standard error
STA	-10.251	-1.5414a	-0.3836	6.6502
STD	-3.2348	-0.5759	-0.1118	5.6161
STL	9.4418	1.2712	0.3793	7.4275
SS	0.7162	0.4739	0.0198	1.5113
SACI	11.524	2.0112[b]	0.2259	5.7298
SLCI	-7.3862	-1.4151[a]	-0.1301	5.2196
SCDS	1.3377	0.7781	0.0225	1.7192
SBL	-1.5919	-0.7832	-0.0333	2.0325
STBS	-0.2675	-0.276	-0.0148	0.9692
CONC3	-0.6805	-3.6222[c]	-0.9167	0.1878
X-EFF	-0.2125	-0.7554	-0.2502	0.2813
S-EFF	0.0488	0.4027	0.2342	0.1213
TAINV	1176100	0.6724	0.00983	1749000
GDPL	-0.000075	-5.3985[c]	-4.71	0.000013
Constant	1.2937	6.9396[c]	6.6661	0.1864

Notes: The superscripts a, b and c denote significant coefficients at the 10, 5 and 1 percent levels respectively. R-square adjusted = 0.2017.

The χ^2 values for the B-P-G, Harvey and Glejser tests are: χ^2 = 20.48 with 14 DF (B-P-G test), χ^2 – 19.12 with 14 DF (Harvey test) and χ^2 = 19.28 with 14 DF (Glejser test). These values do not exceed $\chi^2_{0.95}$ (14 DF) = 23.68 and therefore the null hypothesis holds, and homoscedasticity is present.

Table A3.20. The effect of market structure and efficiency variables on gross profit rates (gross profits/total operating expenses).

Variable name	Est. coefficient	T-ratio (154 DF)	Elasticity at means	Standard error
STA	-28.388	-1.4725[a]	-0.6635	19.278
STD	-6.0471	-0.3714	-0.1306	16.281
STL	20.392	0.947	0.5116	21.532
SS	2.2421	0.5117	0.0388	4.3812
SACI	24.362	1.4667[a]	0.2983	16.61
SLCI	-11.446	-0.7564	-0.1259	15.131
SCDS	0.6062	0.1216	0.0063	4.9837
SBL	-2.6553	-0.4506	-0.0347	5.892
STBS	-0.0258	-0.0092	-0.00089	2.8097
CONC3	-1.6787	-3.0821[c]	-1.4122	0.5446
X-EFF	-0.057	-0.0699	-0.0419	0.8154
S-EFF	0.116	0.3298	0.3472	0.3517
TAINV	4707800	0.9285	0.0245	5070100
GDPL	-0.00023	-5.885[c]	-9.3101	0.00004
Constant	3.5715	6.6085[c]	11.493	0.5404

Notes: The superscripts a and c denote significant coefficients at the 10 and 1 percent levels respectively. R-square adjusted = 0.1951.

The χ^2 values for the B-P-G, Harvey and Glejser tests are: χ^2 = 12.78 with 14 DF (B-P-G test), χ^2 21.12 with 14 DF (Harvey test) and χ^2 = 20.42 with 14 DF (Glejser test). These values do not exceed $\chi^2_{0.95}$ (14 DF) = 23.68 and therefore the null hypothesis holds, and homoscedasticity is present.

Table A3.21. The effect of market structure and efficiency variables on income rates (total income/operating expenses).

Variable name	Est. coefficient	T-ratio (162 DF)	Elasticity at means	Standard error
MS	-5.5352	-2.1709[b]	-0.0326	2.5498
CONC3	-1.0725	-2.2393[b]	-0.2236	0.4789
X-EFF	-0.9003	-1.1247	-0.1648	0.8005
S-EFF	-0.3463	-1.048	-0.2579	0.3305
TAINV	4231300	0.8143	0.0054	5195800
GDPL	-0.00021	-6.1207[c]	-2.09	0.000035
Constant	4.7059	9.6867[c]	3.7727	0.4858

Notes: The superscripts b and c denote significant coefficients at the 5 and 1 percent levels respectively. R-square adjusted = 0.2634.

The χ^2 values for the B-P-G, Harvey and Glejser tests are: χ^2 = 9.44 with 6 DF (B-P-G test), χ^2 9.26 with 6 DF (Harvey test) and χ^2 = 11.85 with 6 DF (Glejser test). These values do not exceed $\chi^2_{0.95}$ (6 DF) – 12.59 and therefore the null hypothesis holds, and homoscedasticity is present.

Table A3.22. The effect of efficiency on market share (share of total assets).

Variable name	Est. coefficient	T-ratio (166 DF)	Elasticity at means	Standard error
X-EFF	0.0408	1.4591[a]	1.2861	0.028
S-EFF	-0.0152	-1.4266[a]	-1.952	0.0106
Constant	0.0121	1.1537	1.6668	0.0104

Notes: The superscript a denotes significant coefficients at the 10 percent level. R-square adjusted – 0.01.

Table A3.23. The effect of efficiency on concentration (three-firm concentration ratio).

Variable name	Est. coefficient	T-ratio (166 DF)	Elasticity at means	Standard error
X-EFF	0.3051	1.8237^{b}	0.2667	0.1673
S-EFF	0.1253	1.9629^{b}	0.4459	0.0638
Constant	0.0751	1.1982	0.2873	0.0626

Notes: The superscript b denotes significant coefficients at the 5 percent level. R-square adjusted = 0.053.

Table A3.24. The effect of market structure and efficiency variables on income rates (total income/operating expenses).

Variable name	W. Germany	France	U.K
	Estimated coefficients (t-statistics in parentheses)		
MS	2.1293 (0.62)	0.0911 (0.03)	1.3124 (0.3)
X-EFF	-0.3856 (-0.95)	-0.2939 (-1.217)	0.2532 (0.127)
S-EFF	-0.3486 (-1.216)	0.2852 (1.073)	-3.6229 (-2.904^{c})
TAINV	-316710 (-0.107)	3854800 (1.76^{b})	36322000 (6.901^{c})
Constant	1.5196 (5.61^{c})	0.8829 (3.022^{c})	4.3438 (4.91^{c})

Notes: The superscripts b and c denote significant coefficients at the 5 and 1 percent levels respectively. R-square adjusted = 0.05 for the W. German sample, 0.06 for the French sample and 0.4053 for the British sample.

The χ^2 values (British sample) for the B-P-G, Harvey and Glejser tests are: χ^2 = 6.04 with 4 DF (B-P-G test), χ^2 = 4.54 with 4 DF (Harvey test) and χ^2 = 7.95 with 4 DF (Glejser test). These values do not exceed $\chi^2_{0.95}$ (4 DF) = 9.48 and therefore the null hypothesis holds, and homoscedasticity is present. Similar tests for the W. German and French samples also show the null hypothesis to hold.

Table A3.25. The effect of the efficiency variables on market share (share of total assets).

Variable name	W. Germany	France	U.K
	Estimated coefficients (t-statistics in parentheses)		
X-EFF	-0.0029 (-0.204)	-0.0146 (-1.101)	0.0873 (0.85)
S-EFF	-0.0126 (-1.25)	-0.017 (-1.15)	0.0577 (0.91)
Constant	0.1722 (1.81[b])	0.0273 (1.74[b])	0.0467 (1.03)

Notes: The superscript b denotes significant coefficients at the 5 percent level. R-square adjusted – 0.02 for the W. German sample, 0.05 for the French sample and 0.05 for the British sample.

APPENDIX 4.

BANKS INCLUDED IN THE EMPIRICAL ANALYSIS.

British banks.

1). The Union Discount Company of London plc

2). Chartered WestLB Holdings Ltd (Foreign bank)

3). Riggs AP Bank Ltd

4). First National Commercial Bank plc

5). Clydesdale Bank plc

6). The Co-operative Bank

7). Saudi International Bank (Foreign bank)

8). Kleinwort Benson Group plc (taken over by Dresdner bank in 1985)

9). Commercial Bank of London plc

10). Lloyds Bank plc

11). Schroders

12). King and Shaxson Holdings plc

13). Coutts and Co.

14). Paine Webber International Bank Ltd (Foreign bank)

15). DG Investment Bank (Foreign bank)

16). Beneficial Bank plc

17). National Westminster Bank plc

18). S. G. Warburg Group plc (owned by SBC)

19). Midland Bank plc

20). Henry Ansbacher Holdings plc

21). Charterhouse plc (partly foreign owned)

22). The Royal Bank of Scotland plc

23). Allied Trust Bank

24). Leopold Joseph

25). BNP U.K Holdings Ltd (Foreign bank)

26). Mount Banking Corporation Ltd

27). Nomura Bank International plc (Foreign bank)

28). Yorkshire Bank plc

29). Lombard North Central plc

30). Moscow Narodny Bank (Foreign bank-owned by the Russian state)

31). Hambros plc

32). Barings plc (taken over by ING in 1995)

33). Barclays plc

34). TSB Bank plc

35). The Agricultural Mortgage Corporation plc

36). Bank Leumi (U.K) plc (Foreign bank)

37). Girobank plc

38). First National Bank plc

39). Morgan Grenfell plc

<u>Building societies.</u>

40). Woolwich Building Society

41). National and Provincial Building Society

42). Bristol and West Building Society

43). Norwich and Peterborough Building Society

44). Birmingham and Midshires Building Society

45). Lambeth Building Society

46). Alliance and Leicester Building Society

47). Nationwide Bulding Society

48). Cheltenham and Gloucester Building Society

49). Nottingham Building Society

50). Northern Rock Building Society

W. German banks.

51). Baden-Wurttembergische Bank

52). Frankfurter Volksbank eG

53). Bremer Landesbank

54). Weberbank

55). Frankfurter Sparkasse

56). Nassauische Sparkasse

57). Kreissparkasse Osnabruck

58). Citibank Aktiengesselschaft

59). Deutsche-Skandinavische Bank AG

60). Stadtsparkasse Munchen

61). Sparkasse Pforzheim

62). Deutsche Ausgleichsbank

63). Kreissparkess Calw

64). Industriekreditbank AG

65). Sal Oppenheim JR and CIE

66). Wiesbadener Volksbank eG

67). Bayerische Vereinsbank AG

68). Bankhaus Lampe

69). Hamburger Sparkasse

70). Deutsche Centralbodenkredit AG

71). Volksbank Hannover

72). Frankfurter Hypothekenbank AG

73). Landesbank Berlin

74). Oldenburgische Landesbank AG

75). Hamburgische Landesbank AG

76). Royal Bank of Canada AG

77). Commerzbank

78). Landwirtschaftlische Rentenbank

79). Stadtsparkasse Monchengladbach

80). Sparkasse Freiburg

81). Heidenheimer Volksbank eG

82). Schroder Munchmeyer Hengst and Co.

83). Deutsche Bank AG

84). Berliner Volksbank

85). Landesbank Rheinland-Pfalz

86). Sparkasse Karlsruhe

87). Deutsche Kredit und Handelsbank

88). Bankhaus Reuschel and Co. Munchen

89). Bankhaus H. Aufhauser Munchen

90). Frankfurter Bankgesellschaft

91). Berliner Bank Aktiengesellschaft

92). Deutsche Apotheker und Arztebank eG

93). ADCA bank AG

94). Berenberg Bank

95). Kreditanstalt fur Wiederaufbau

96). Hamburger Bank

97). Deutsche Schiffsbank

98). Norddeutsche Landesbank Girozentrale

99). KKB Bank AG

100). Dresdner Bank

101). Berliner Pfandbrief Bank

102). BHF Bank

103). Stadtsparkasse Augsburg

104). Schweizerische Bankgesellschaft AG

105). Bezirkssparkasse Heidelberg

106). Volksbank Reutlingen

107). WGZ Bank

108). Munchener Hypothekenbank eG

109). Stadtsparkasse Wuppertal

110). Merck Finck and Co.

111). Sparkasse Saarbrucken

112). Volksbank Paderborn eG

113). Sparkasse Krefeld

114). Schweizerische Kreditanstalt AG

115). Kreissparkasse Waiblingen

116). Saar Bank

117). Delbruck and Co.

118). Stadtsparkasse Duisburg

119). Kreissparkasse Koln

120). Hohenzollerische Landesbank Kreissparkasse

121). Vereins und Westbank Aktiengesellschaft

122). Rheinische Hypothekenbank

123). Berliner Industriebank AG

124). Sparkasse Koblenz

125). Trinkaus und Burkhardt

French banks.

126). Banque Nationale de Grece (France)

127). L' Europeenne de Banque

128). Banque Morhange

129). Banque Worms

130). Banque Franco Rommaine

131). Banque Sanpaolo

132). Banque Sudameris

133). BICS Banque Populaire

134). VIA Banque

135). Banque Francaise du Commerce Exterieur

136). Banque Rhone-Alpes

137). Banco di Roma (France)

138). Banque Federative Credit Mutuel

139). Credit du Nord

140). Batif Banque

141). Credit Foncier

142). Banque du Phenix

143). SNVB

144). Electro Banque

145). MATIF S.A

146). Banque Internationale de Placement

147). SOFAL

148). Banque de la Cite

149). National Bank of Kuwait (France)

150). Republic National Bank of New York (France)

151). Lyonnaise de Banque

152). UFB Locabail

153). Compagnie Parisienne de Reescompte

154). Credit Industriel d' Alsace et de Lorraine

155). CCF

156). Societe Parisienne de Banque

157). Barclays Banque S.A

158). CALIF

159). Sophia-Bail

160). Societe Financiere Immobanque

161). Bayerische Vereinsbank S.A

162). Banque Nationale de Paris

163). Banque la Henin

164). Banque Laydernier

165). Banque Scalbert Dupont

166). La Compagnie Financiere Edmond de Rothschild Banque

167). Societe Generale

168). Credit Lyonnais

169). CNCA

APPENDIX 5.

COLLECTION OF BANKING DATA: A TYPICAL BANK BALANCE SHEET.

The banking data used in the empirical analysis in the thesis were extracted from annual reports and accounts kindly provided to us by 169 individual banks (50 British, 43 French and 76 W. German). Information on individual banking activities (figures for each bank's involvement in various asset and liability categories) was extracted from balance sheets. The following table depicts a typical balance sheet; it is National Westminster Bank's balance sheet (situation as of 31 December 1990).

ASSETS.(in £ mil.).

Coin, bank notes and balances with the Bank of England and with State banks abroad	1,005
Items in course of collection on other banks	1,187
Money at call and short notice	7,527
Bills discounted	1,727
Dealing assets	406
Certificates of deposit	1,206
Investments	439
Advances and other accounts	54,990
Amounts due from subsidiary undertakings	15,962
Investments in associated undertakings	60
Investments in subsidiary undertakings	2,683
Premises and equipment	2,504
	89,696

LIABILITIES (in £ mil.)

Ordinary shareholders' funds:	
Ordinary share capital	1,615
Reserves	3,363

Preference share capital	14
Undated loan capital	1,681
Dated loan capital	1,738
Amounts due to subsidiary undertakings	6,079
Current, deposit and other accounts	74,158
Other liabilities	1,048
	89,696

Notes to the accounts.

Dealing assets. This item includes both listed and unlisted investments undertaken in the U.K and abroad. Listed investments are stated at middle-market prices and unlisted investments at directors' estimates.

Investments. This item is composed of : Securities listed in the U.K (£10 mil.), Securities listed elsewhere (£298 mil.) and other unlisted investments (£131 mil.). The valuation of listed investments is at middle-market prices and of unlisted investments at directors' estimates.

Advances and other accounts. Advances and other accounts include the items:

Due from customers	47,432
Market placings over one month	7,137
Other debtors and prepaid expenses	375
Deferred taxation (see correspondent note)	46
	54,990

Investments in associated undertakings. This item includes all the bank's investments in its associated undertakings the most important of which are the following: 3i Group plc, BACS Ltd., Banca Creditwest e dei Comuni Vesuviani SpA (incorporated in Italy), BCH Property Ltd., International Commodities Clearing House Holdings, Signet Ltd., and The Agricultural Mortgage Corporation plc.

Investments in subsidiary undertakings. The principal subsidiary undertakings of National Westminster Bank plc (the bank holds either directly or indirectly 100% of the equity share capital) are: Banco Natwest Espana SA (99.4% of share capital), Centre-life Ltd., Coutts and

Co., Handelsbank Natwest (86.88% of share capital), Isle of Man Bank Ltd., Lombard North Central plc., Natwest Bank AG, Natwest Bank NJ, Natwest Bank of Canada, Natwest Bank SA, Natwest Bank of USA, Natwest Financial Futures Ltd., Natwest Home Loans Ltd., Natwest Insurance Services Ltd., Natwest Australia Bank Ltd., Natwest International Trust Holdings Ltd., Natwest Investment Bank Ltd., Natwest Personal Financial Management Ltd. and Ulster Bank Ltd.

Share capital. This item includes: Warrants exercised (£28 mil.), Shares in lieu of dividends (£3 mil.), Shares issued under Profit Sharing and Share Option Schemes for staff (£8 mil.) and finally, Shares issued and fully paid at 1 January 1990 (£1,576 mil.).

Reserves.

At 1 January 1990	3,235
Retentions for the year	268
Transfer to profit and loss account of revaluation surplus realised on sale of Yorkshire Bank plc	(190)
Shares in lieu of dividends	8
Warrants exercised	35
Other movements	7
	3,363

Deferred taxation. Tax is deferred or accelerated by timing differences and accounted for to the extent that it is probable that a liability or asset will arise. It is calculated at rates expected to be applicable when the liabilities or assets are expected to crystallise.

Current, deposits and other accounts.

Sterling:	Current accounts	11,074
	Deposit and other accounts	40,360
Currency:	Current accounts	1,831
	Deposit and other accounts	20,893
		74,158

Other liabilities. Other liabilities include the items: Creditors and accrued expenses (£534 mil.), Taxation (£330 mil.) and Dividends (£184 mil.).

Information about profits, net interest income, non-interest income, commission income, depreciation etc. was extracted from profit and loss accounts. The following table presents National Westminster Bank's Profit and Loss Account (as of 31 December 1990).

Profit and Loss Account (in £ mil.).

Profits before charge for bad and doubtful debts	
and exceptional items	1,662
Charge/(release) for bad and doubtful debts	
Commercial and personal	1,237
Problem countries	(84)
	1,153
Profits before exceptional items	509
Exceptional items	(5)
Profits before taxation	504
Taxation	292
	212
Minority interests	4
Preference dividends of the Bank	1
Profits after taxation and before extraordinary items	207
Extraordinary items	163
Profits attributable to ordinary shareholders of the Bank	370
Ordinary dividends: Interim	100
Final	184
Retentions for the year	86

Notes to the Profit and Loss Account.

Profit before taxation.

Income.

Interest income	14,347
Less Interest Expense	10,744
Net interest income	3,603

Commission	1,613
Foreign exchange	130
Other income	281
Total income	**5,627**
Expenditure.	
Operating costs: Personnel costs	2,362
Premises and equipment	703
Other expenditure	922
	3,987
Bad and doubtful debts: Specific	1,035
General	118
Total expenditure	**5,140**
Trading surplus	487
Exceptional items	5
Share of associated undertakings' results	22
Profits before taxation	**504**

Exceptional items. Exceptional items are the bank's provisions relating to civil claims and costs arising from the Blue Arrow plc rights issue.

Extraordinary items. Extraordinary items is the bank's surplus produced on disposal of an investment in Yorkshire Bank plc.

Net interest income is the variable used in our analysis instead of interest rates paid on deposits or charged for loans. Net interest income is the difference: interest and interest related income from loans and money market transactions-interest and interest related expenses and is a good proxy for interest rates (used by many authors of s-c-p empirical studies). Increases/reductions in the net interest income item are often (in many Annual Reports and Accounts) attributed to less greater competition in the deposits and loans markets.

Total national market figures for all asset and liability categories were taken from central bank publications, namely, the Bank of England's Quarterly Bulletin, the Deutsche Bundesbank's Monthly Reports and the Banque de France's Statistique Trimestriele. These figures were divided by each bank's figures indicating its involvement in various asset and liability categories in order to get all banks' market shares of the total national domestic market activities.

Per capita income is expressed in pounds sterling and is calculated as follows: Gross Domestic Product figures for the three countries in question are taken from the International Monetary Fund's **International Financial Statistics Series**. Population estimates are provided in **Population Trends** (Autumn 1991), a publication of the Office of Population Censuses and Surveys. The exchange rates are taken from the Deutsche Bundesbank's Montly Reports (1£ 2.877 DM and 1£−9.693 FFr at the end of 1990). Hence, the calculated per capita income for 1990 is £13,275.61 for W. Germany, £11,850.88 for France and £9,474.49 for the U.K.

APPENDIX 6.

IMPLEMENTATION OF E.U LEGISLATION IN THE U.K, FRANCE AND GERMANY.

Table A6.1. Implementation of E.U legislation in France.

European Legislation	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
Consolidated Surveillance	D		E I										
Consolidated Accounts				D				E	I				
Liberalis. of capital movements								I					
Branch establishment ouside E.U						P	D		E I				
Own Funds Directive (OFD)						P	D	I	E		E		
Second Banking Directive						P	D			I	E		
Solvency Ratio Directive (SRD)						P	D		E I				
Money Laundering Directive									D	E I			
Modifications to OFD									D	I	E		
Large Exposures Directive					R					D	I	E	
Modifications to Consol. Surveil.										D E			I
Modifications to SRD												D E	
Deposit Insurance Directive												D E	

Notes: R – E.U Recommendation, P = E.U Proposal, D = E.U Directive, E = Official Enactment Deadline and I = Implemented into national law.

Table A6.2. Implementation of E.U legislation in Germany.

European Legislation	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
Consolidated Surveillance	D	I	E										
Consolidated Accounts				D				E		I			
Liberalis. of capital movements													
Branch establishment ouside E.U						P	D		E	I			
Own Funds Directive (OFD)						P	D		E	I	E		
Second Banking Directive						P	D			I	E		
Solvency Ratio Directive (SRD)						P	D		D E	I			
Money Laundering Directive									D	E	I		
Modifications to OFD									D	I	E		
Large Exposures Directive					R					D		E	I
Modifications to Consol. Surveil.										D E			I
Modifications to SRD												D E	
Deposit Insurance Directive												D E	

Notes: R = E.U Recommendation, P = E.U Proposal, D = E.U Directive, E = Official Enactment Deadline and I = Implemented into national law.

The liberalisation of capital movements was completed in 1981.

Table A6.3. Implementation of E.U legislation in the U.K.

European Legislation	**'79**	**'83**	**'84**	**'85**	**'86**	**'87**	**'88**	**'89**	**'90**	**'91**	**'92**	**'93**	**'94**
Consolidated Surveillance	I	D		E									
Consolidated Accounts					D				E				I
Liberalis. of capital movements	I												
Branch establishment ouside E.U							P	D		E		I	
Own Funds Directive (OFD)							P	D		E	I	E	
Second Banking Directive							P	D				E I	
Solvency Ratio Directive (SRD)							P	D		D E	I		
Money Laundering Directive										D	E	I	
Modifications to OFD										D		E	
Large Exposures Directive						R					D	I	E
Modifications to Consol. Surveil.											D E	I	
Modifications to SRD												D E	
Deposit Insurance Directive												D E	

Notes: R – E.U Recommendation, P = E.U Proposal, D = E.U Directive, E = Official Enactment Deadline and I = Implemented into national law.

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